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INTERNATIONAL APPLICATION NO.

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23 July 1999

TITLE OF INVENTION

SYSTEM AND METHOD FOR MANAGING SWAP ORDERS

APPLICANT(S) FOR DO/EO/US

Joseph BORKOWSKI

EXPRESS MAIL CERTIFICATE

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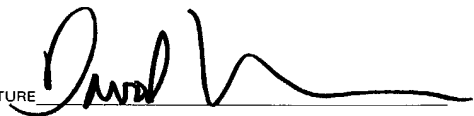
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Applicant herewith submits to the United States Designated/Elected office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S. C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S. C. 371 (b) and PCT Articles 22 and 39 (1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S. C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau
 - c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S. C. 371 (c)2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c) (3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) (unsigned).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98 (with 4 references).
12. ☐ An assignment document for recording. A **separate** cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney an/or address letter.
16. ☒ Other items or information: **Letter Accompanying U.S. National Phase Filing; copy of International Preliminary Examination Report**

U.S. APPLICATION NO. (if known sec 37 C.F.R. 1.50) 10/031996		INTERNATIONAL APPLICATION NO.: PCT/US00/20394		Attorney's Docket Number 2644/1F609-US4	
17. [x] The following fees are submitted: Basic National Fee (37 CFR 1.492 (a)(1)-(5)): Search Report has been prepared by the EPO [] or JPO [] \$890.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) \$710.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445 (a) (2))... \$740.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... \$1,040.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4).... XXX \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS	PTO USE ONLY
Surcharge of \$130.00 for furnishing the oath or declaration later than []20 []30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
Claims	Number Filed	Number Extra	Rate		
Total Claims	42-20	22	22 X \$18.00	\$396.00	
Independent Claims	5 -3	2	2 X \$84.00	\$168.00	
Multiple dependent claims(s) (if applicable) + 280				\$564.00	
TOTAL OF ABOVE CALCULATIONS =				\$564.00	
Reduction by 1/2 for filing by small entity, if applicable.				\$282.00	
SUBTOTAL =				\$282.00	
Processing fee of \$130.00 for furnishing the English translation later the [] 20 [] 39 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$282.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). the assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$0.00	
TOTAL FEES ENCLOSED =				\$282.00	
				Amount to be refunded	\$
				charged	\$
4. [X] A check in the amount of \$282.00 to cover the above fees is enclosed. b. [] Please charge my Deposit Account No.04-0100 in the amount of \$ to cover the above fees. c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 04-0100. A duplicate copy of this sheet is enclosed. NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status. SEND ALL CORRESPONDENCE TO: David Leason Darby & Darby P.C. 805 Third Avenue New York, New York 10022-7513 <div style="text-align: right;">SIGNATURE  NAME David Leason REGISTRATION NO 36,195</div>					

U/031996

JC19 Rec'd PCT/PTO 22 JAN 2002

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PATENT TRADEMARK OFFICE

Docket No.: 2644/1F609-US4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Joseph BORKOWSKI

Serial No.: t/b/a (U.S. National Phase of International Application

No. PCT/US00/20394 filed July 24, 2000)

Filed: Concurrently Herewith

For: SYSTEM AND METHOD FOR MANAGING SWAP ORDERS

PRELIMINARY AMENDMENT

Hon. Commissioner of
Patents and Trademarks
Washington, DC 20231

Box PCT
Attn.: DO/EO/US

Sir:

Prior to examination, please amend the above-identified application as follows:

In the Specification:

Page 1, above line 3, insert the following paragraph:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a U.S. national phase application under 35 U.S.C. § 371 based upon co-pending International Application No. PCT/US00/20394 filed July 24, 2000, which claims the benefit of priority of U.S. Provisional Application Serial Nos. 60/145,473 filed July 23, 1999 and ~~60/1~~62,168. The U.S. was designated as a continuation of Serial No. 09/457,723 filed December 9, 1999. The entire disclosures of the prior applications are incorporated herein by reference. The international application was published in the English language on February 1, 2001 under Publication No. W001/07986.

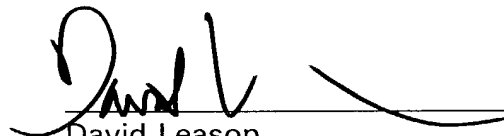
REMARKS

The specification has been amended to provide proper reference to the prior related applications.

Entry of the Amendment is respectfully requested.

Respectfully submitted,

Dated: January 22, 2002


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M:\2644\1F609\HR2108 WPD
Serial No. t/b/a

Docket No. 2644/1F609-US4

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PCT/US00/20394

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SYSTEM AND METHOD FOR MANAGING SWAP ORDERS

This patent application claims priority from U.S. Provisional Patent Application Serial No. 60/145,473, filed July 23, 1999 and U.S. Provisional Patent Application Serial No. 60/162,168, filed October 28, 1999, the disclosures of which are hereby incorporated by reference as if set forth in their entireties herein.

FIELD OF THE INVENTION

This invention relates to a method and system for conducting convertibles trading in general and for employing convertible hedging (arbitrage) strategies in particular. More specifically, this invention relates to an automated method and system for managing and trading instruments in the convertible markets including managing and trading instruments in convertible arbitrage situations. The convertible markets as referenced herein include such instruments as convertible bonds, convertible preferred stocks, structured convertible securities, equity and index options, warrants, and other tradable convertible and convertible related instruments. The present system and method also relates to managing and trading instruments in risk-arbitrage situations concerning mergers, different classes of stock, when-issued securities, rights, and other such tradable instruments employed in conducting risk-arbitrage.

BACKGROUND OF THE INVENTION

Arbitrage is broadly defined as the simultaneous purchase and sale of the same or equivalent security in order to take advantage of pricing differentials created by market conditions. The term has been expanded in recent years to include hedging strategies that do not involve an immediate arbitrage profit. In practice, purchases and sales are not necessarily made "simultaneously" and the meaning of the "same or equivalent security" is well understood by arbitrageurs. Compared to other forms of trading, arbitrage is sophisticated, though has remained an arcane art.

Convertible traders and arbitrageurs include fund managers (e.g., hedge, mutual, and pension), investment and portfolio managers, bank trust departments, broker-dealers, and other businesses that engage in convertibles trading and arbitrage. Their

practice is mainly paper oriented and relies upon voice communication (e.g., telephone) and remains largely unchanged since the earliest days of convertibles trading and arbitrage. Prior art methods have resulted in fragmenting the markets for convertibles trading and arbitrage.

5 The following background is provided from the perspective of a convertibles trading and arbitrage firm located at the New York Stock Exchange (NYSE) which acts in the capacity of an agent (customer trading only). Each trading day, prior to the market opening, the NYSE firm receives from its customers (other convertibles traders and arbitrageurs), who are located upstairs, that is, outside of or off of the floor
10 of the exchange, various orders to engage in convertibles trading and arbitrage. Since the majority of these orders are provided to conduct convertible arbitrage, and since other convertibles trading and arbitrage techniques are conducted in a similar manner, the following description of the NYSE firm's business method focuses on convertible arbitrage. The NYSE firm receives orders, commonly referred to as swap orders, to
15 either set up (buy), cover (buy), turn (sell), or reverse (short) convertible hedges, which is a common practice in convertible arbitrage. Such orders can be conveyed to the NYSE firm from its customers in a variety of ways, but are typically relayed to the firm by telephone at which point they are tracked on pieces of scratch paper. Thereafter, the NYSE firm arranges the bids and offers for the convertible securities versus the pre-
20 opening price of the security being traded (hedged up) against on a summary sheet for later reference. Primarily accomplished via the short sale of common stock, hedging with equity and index options is also popular. In the typical case of convertible arbitrage at the NYSE firm, the convertible or related instrument is bid for or offered out against common stock.

25 Using the order information provided by the customers to the NYSE firm, a formal swap order is prepared, time-stamped, and kept handy in the event that market conditions or customer instructions permit execution of the trade. Once the market opens and thereafter, any changes in the swap orders are recorded on both the scratch sheets and the summary sheet. Throughout the trading session, the NYSE firm receives requests
30 from its customers for market quotes (i.e. best bid and offer quotations) in individual convertible arbitrage situations. (These markets, comprised of swap orders, are commonly referred to as swap markets in convertible arbitrage.) The bid or offer for a

given issue (in this case, a convertible instrument) must be repriced as the price of its underlying security being traded against moves. The repricing of a convertible instrument can be explained using an example of a convertible preferred arbitrage situation. A particular customer telephones the NYSE firm and requests the market in
5 PKS^{PrA} versus 38 2/16 (in the common stock of PKS). If all bids and offers for the preferred instrument currently are priced versus (a common stock price of) 37 11/16, then the bids and offers for the convertible instrument must be repriced as follows:

1) The scratch sheets containing orders for all customers involved in the PKS^{PrA} market must be pulled. This requires sorting the orders by this particular financial
10 instrument whereas industry practice has the orders sorted by customer (e.g., the orders of Smith Barney, Goldman Sachs, etc. are consolidated regardless of the instrument involved).

2) The convertible instrument is then repriced using paper, pen, and calculator, with the repriced bid or offer being equal to the bid or offer plus $(\Delta \text{PKS}) \times (\text{Conv. Ratio}) \times (\text{Hedge \%})$. The product of the conversion ratio and the hedge
15 percentage is equivalent to a "per share hedge".

3. Step 2 is repeated for each customer involved in the PKS^{PrA} market.

4. The repriced bids and offers are noted on the scratch sheets for PKS^{PrA} and are then transcribed to the summary sheet.

20 5) Thereafter, the swap market in PKS^{PrA} consisting of the best bid and offer prices is determinable and quotable to a customer.

At the close of the trading session, all swap markets are repriced versus the closing price of the respective security being traded against. (In convertible arbitrage, this is referred to as dollar neutraling.) This is done by repricing the convertible
25 instrument as explained above and noting the new price on the scratch sheets and the summary sheet. Before the next trading session begins, all customer orders are confirmed by telephone from the scratch sheets and the procedure is repeated. The orders are routinely transcribed to the summary sheet, and the convertible instruments are frequently repriced as the price changes in the securities being traded against.

30 A problem with existing systems and methods for communicating, managing and conducting convertibles trading and arbitrage in financial instruments is that a comprehensive awareness of interest in convertible securities and in a given

arbitration situation is unavailable to investors and traders alike, causing the market to be less efficient than it otherwise could be. As illustrated in Fig. 1, the traditional systems rely on telephone communications by and between, for example, broker-dealers, hedge fund managers, and other businesses that engage in convertibles trading and arbitrage.

5 The method of conveying information by telephone often results in miscommunication. Additionally, such information is subject to scrivener error in transcribing relayed orders. Miscalculations result from calculating and repricing hedges with a calculator. Often times, several minutes or more are consumed because of these miscommunications and miscalculations. This is detrimental to convertible traders and arbitrageurs considering
10 that the passing of seconds in a fast moving market could cause calculated and relayed information to become outdated. Ultimately, each convertibles trader and arbitrageur has a different fragment of the overall market picture due to the lack of a uniform and efficient method of order management, and a much-needed centralized mode of electronic communication and trading.

15 What is needed in the art of convertibles trading and arbitrage is a uniform and centralized system and method that more effectively facilitates the management of orders for convertible traders and arbitrageurs. For convertibles traders in general and convertible arbitrageurs in particular, such orders include convertible bonds, convertible preferred stocks, structured convertible securities, equity and index options, warrants, and
20 other tradable convertible and convertible related instruments. For those engaging in risk-arbitrage, such orders include mergers, different classes of stock, when-issued securities, rights, and other such tradable instruments employed in conducting risk-arbitrage. Further, what is needed in the art is such a system and method that provides automated management of information from a variety of sources and substantially real-
25 time, automated reporting of the current swap markets in a variety of instruments. What is further needed in the art is a uniform and centralized system and method for the electronic management and trading of instruments in the convertible market in general and in convertible and risk arbitrage situations in particular. The present invention satisfies these and other needs as described below.

SUMMARY OF THE INVENTION

The present invention provides an efficient uniform and centralized system and method for conducting convertibles trading in general and convertible and risk-arbitrage in particular. The invention increases the liquidity of the convertible markets and facilitates convertible and risk-arbitrage business while eliminating a significant element of human error that exists in prior art methods. The invention permits greater information flow and heightened data integrity, both of which provide a significant competitive advantage over existing systems and methods. Improvements provided by the invention extend from initial order entry through order execution and reporting.

In one aspect, the present invention provides, in a computer implemented system, a method for identifying a current swap market in one or more tradable instruments. According to this aspect of the inventive method, plural bids and offers are received for at least one tradeable instrument, with each bid and offer including move percent data which relates new values for such bids and offers to any changes in price in an underlying instrument. The bids and offers are periodically updated using the move percent data in response to changes in price in the underlying instrument. The best bid and best offer for the tradeable instrument are provided on an electronic display and are correlated with a particular price of a predetermined underlying instrument.

The correlation, in a preferred form of the foregoing method, is a display of the best bid and best offer proximate to a display of the particular price for the predetermined underlying security. Also in a preferred form, the bids and offers are received from remote stations through an electronic communication link.

In another aspect, the invention provides a method for identifying on a display of a computer a current swap market among plural pending orders to trade a particular instrument. At any given price of an underlying security, the best bid order and the best offer order in the current swap market will change. Each of the pending orders specifies a move percentage and a price of the instrument priced relative to a versus for the underlying security. According to this method, a current price quote concerning the underlying security is provided to the computer. A difference value is then calculated between the versus and the current price quote for each of the pending orders. Each of

the pending orders is automatically modified to effect dollar neutraling and at least a portion of the modified orders are displayed on the display of the computer.

In a preferred form of the foregoing method, the current price quote is provided to the computer using a real-time data feed. In addition, the modified orders can be sorted and only best bid order and the best offer order need be displayed.

In still a further aspect of the invention, a method for swapping a financially tradeable instrument is disclosed. That method provides a plurality of swap orders for display at a station connected to a distributed computer network. Each of the swap orders specifies a price for the instrument, a number of the instrument to be traded, and a hedge. A central server connected to the station obtains a selection of a particular swap order and terms for executing the trade. The terms for executing the trade are compared to the price, number and hedge specified in the particular swap order, and, in the event that the terms match, the swap order is handled by automatically executing the swap order.

Preferably, the method for swapping the financially tradeable instrument handles trades with matching terms by trading the specified number of the instrument at the price and trading a number of an underlying instrument in accordance with the hedge at a current market price for said underlying instrument. This method preferably handles trades which lack matching terms by establishing an anonymous and electronic negotiation session between the station that posted the particular swap order and the station from which the terms for executing the trade were obtained, and by automatically executing the trade if, as a result of the negotiation session, the terms match.

In further preferred arrangements of the foregoing trading method, the comparison is made at the central server. Also, the trading method preferably includes the additional step of accessing a fee schedule associated with the station and charging for the trade in accordance with the fee schedule. The station also can have associated trading preferences which define the hedge to be specified at a given moment.

In yet a further aspect of the invention, a method for swapping a financially tradeable instrument allows a user to rapidly select and execute a particular swap order in a given instrument. In accordance with this method, a plurality of swap orders, each specifying a price for the instrument, a number of the instrument to be traded, and a hedge, is displayed at a station connected to a distributed computer network.

The user selects a particular swap order from the display and thereafter confirms that the terms of the selected swap order are acceptable. If the terms are confirmed as acceptable, the swap order is forwarded for automatic execution. In a preferred form of this method, the specified price, number and hedge are included from the selected swap order on both
5 buy and sell sides of a trade ticket.

These and other aspects of the invention, including particular features that facilitate data entry, order management, advertisement of issues available for trading, pricing functions, trade execution, trade negotiation, and other features can be appreciated from the accompanying Drawings and Description of the Preferred
10 Embodiments.

DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates a prior art arrangement for communicating convertibles trading and arbitrage trade information;

Fig. 2 illustrates a schematic arrangement for communicating information
15 and executing orders pertaining to convertibles trading and arbitrage in accordance with a preferred embodiment of the invention;

Fig. 3 is an exemplary data entry form that a user or customer can use to enter orders for use by the system and method of the present invention;

Fig. 3A is an alternative data entry form that can be used in lieu of the
20 form displayed in Fig. 3 for entering buy-side orders;

Fig. 3B is an alternative data entry form that can be used in lieu of the form displayed in Fig. 3 for entering sell-side orders;

Fig. 4 depicts a standard relationship between the price track of a convertible instrument relative to the underlying security that it is traded against;

Fig. 4A depicts a standard relationship between the price track of a
25 warrant relative to an underlying security that it is traded (hedged up) against;

Fig. 5 illustrates a book page that provides a display of the best market in an issue relative to the current price in the underlying security in accordance with the preferred embodiment of the invention;

Fig 5A is a flow diagram illustrating a process for entering an order;

Fig. 5B is a flow diagram illustrating the data processing steps associated with each order that is entered;

Fig. 6 illustrates a summary display of plural market boxes, each market box showing the swap market in a particular issue;

Fig. 7 illustrates the book page of Fig. 5 at a later point in time on the same trading day at which time the common stock price has gone up 9/16ths of a point;

5 Fig. 7A illustrates the data entry form of Fig. 3A with updated and adjusted values to reflect changes in the price of the underlying instrument;

Fig. 7B illustrates a trade ticket form similar to the data entry forms of Figs. 3A and 3B, shown with matching terms as between one buyer and one seller;

10 Fig. 7C illustrates the trade ticket form as in Fig. 7B, this time showing matching terms as between one buyer and various sellers

Fig. 8 illustrates a split print display containing the two execution prices needed to achieve a particular execution price that is not in the industry standard increment of 1/16 of a dollar;

15 Fig. 9 illustrates an average price display depicting the average price of several executions at different prices in a given underlying security;

Fig. 10 illustrates a market box from Fig. 6 reporting an updated swap market in the issue in view of a change in the price of the underlying security for that issue;

20 Fig. 11 illustrates an updated split print display as in Fig. 8 in view of the change in the price of the underlying security reflected in Fig. 10;

Fig. 12 illustrates the data entry form of Fig. 3, with all bids and offers in the swap market remarked after the close of a trading day with new versus data;

25 Fig. 13 illustrates a fact sheet which itemizes for a series of issues the last sale plus-tick price of the underlying security and the best swap market as of the close of the trading day;

Fig. 14 illustrates a flow diagram for logging a user onto an arbitrage network system (ANS) in accordance with a preferred embodiment of the invention;

Fig. 15 illustrates an electronic display provided by the ANS of Fig. 14 including a toolbar that can be provided to guide users to various functions of the ANS;

30 Fig. 16 illustrates an electronic display of a price it function;

Fig. 16A illustrates a touchpad display for entering data;

Fig. 17 illustrates a process flow for the price it function;

Fig. 18 illustrates an electronic display of an advertise market function;

Fig. 19 illustrates a process flow for the advertise market function;

Fig. 20 illustrates a process flow for tracking and processing responses to advertised markets;

5 Fig. 21 illustrates a process flow for managing average price determinations;

Fig. 22 illustrates a process flow for managing split print trades

Fig. 23 illustrates a process flow for managing trade requests in accordance with a further aspect of the preferred embodiment of the invention;

10 Fig. 24-1A illustrates a trade ticket form in which the buyer is taking the seller's offer;

Fig. 24-1B illustrates a trade ticket form in which the buyer seeks only a portion of the shares in the seller's offer;

15 Fig. 24-1C illustrates a report of order execution ticket for a confirmed trade using the trade ticket of Fig. 24-1A;

Fig. 24-1D illustrates an updated data entry form showing the remaining shares being offered for sale from the seller's original offer;

20 Fig. 24-2B illustrates a trade ticket form in which the buyer seeks to negotiate for only a portion of the shares in the seller's offer and in which the buyer specifies move and hedge requirements which do not match the requirements specified in the seller's offer;

Fig. 24-2C illustrates a report of order execution ticket for the buyer indicating that the seller has accepted the buyer's proposed negotiated share quantity and hedge and move percentages;

25 Fig. 24-2D illustrates an updated data entry form showing the remaining shares being offered for sale from the seller's original offer;

Fig. 24-2E illustrates an alternative, updated data entry form in which the hedge has been adjusted for the remaining shares being offered so as to maintain the hedge percentage of the seller's original offer upon selling the remaining shares;

30 Fig. 24-3A illustrates a trade ticket form in which the buyer selects his own bid as well as one of the offers listed in the book page of Fig. 5 and negotiates a trade;

Fig. 24-3B illustrates the seller's response to the negotiation in which the seller has come down on the price specified in the offer and has raised the hedge percentage;

Fig. 24-3C illustrates a trade ticket form in which the buyer has decided to pay up for the convertible instrument by accepting the seller's proposed price and hedge percentage and the trade is ready to be confirmed or canceled;

Fig. 24-3D illustrates a report of order execution ticket after both sides have confirmed the negotiated trade;

Fig. 25 illustrates a process flow for processing trade requests in accordance with a further aspect of the preferred embodiment of the invention;

Fig. 26 illustrates a process flow for enabling buyers and sellers to negotiate the terms of a trade;

Fig. 27 illustrates, in functional block diagram form, an automated order management system in accordance with the invention in which convertibles trading firms and arbitrage firms independently manage the swap orders of their respective customers using stand-alone (non-networked) computers without any information sharing, trading or communication therebetween;

Fig. 28 illustrates, in functional block diagram form, an automated system in accordance with the invention in which the customers of one or more convertibles trading and arbitrage firms, as well as the convertibles trading and arbitrage firms themselves, can share information and manage their swap orders through a common computer network;

Fig. 29 illustrates, in functional block diagram form, an automated system in accordance with the invention in which subscribers communicate directly with one another through an arbitrage network system with the ability to view the swap markets in a variety of markets, exchange information, and trade directly with other subscribers free of any intermediary acting in an agency capacity for such subscribers; and

Fig. 30 illustrates a preferred flow diagram for trading.

30 DETAILED DESCRIPTION OF CERTAIN PREFERRED EMBODIMENTS

By way of overview and introduction, the present invention provides an improved business system and method for managing convertibles trading and arbitrage

situations and for identifying current swap markets in particular instruments. The invention is suited for operation on a central server accessible by plural, distributed clients over a wide area or global network such as the Internet. For example, Fig. 2 illustrates an arbitrage network system 200 (ANS) in which each user 202-210 has an
5 ANS interface 212 to connect with the ANS through a respective bi-directional communication line 214. The ANS is an electronic communication network which (1) coordinates information to and from subscribers, data services, and one or more exchanges, and (2) processes information from such services. The ANS can be hosted by one or more servers. As illustrated, hedge fund managers 204, 206, broker dealers
10 202, 208 and New York Stock Exchange (NYSE) member firms 210 can be simultaneously connected to the ANS 200 and enjoy the full advantage of the system and method of the present invention. Such users may include any convertibles trader or arbitrageur regardless of their location worldwide. The ANS 200 preferably is in bilateral communication with at least one other electronic communication network 220 (ECN),
15 such as an ECN operated by the NYSE. In the following description, the invention is described in connection with a specific embodiment in which programmed macros are used in a standard spreadsheet environment; however, the invention can be embodied in other forms including a stand alone application running on a central server, a mainframe computer, or a personal/laptop computer; the description of the preferred embodiment
20 being presented to explain the best mode presently known to the inventor.

With reference now to figures 3-13, a preferred embodiment is described in connection with a set-up order in which a customer desires to establish a position in a convertible instrument and sell short the underlying security. The order can be entered into a data entry sheet 300 such as illustrated in Fig. 3 or another data entry sheet. The
25 data entry sheet preferably is displayed within a pop-up window, for example, in response to pressing a "place order" button (see button 1541A described below). Data entry and form processing can be performed in a conventional manner using a graphical user interface (GUI) and client- or server-side form processing such as Java or JavaScript.

The data entry sheet 300 of Fig. 3 is specific to a convertible preferred
30 stock that trades under the symbol "PHI^{PrA}" as indicated at 301. The data entry sheet can concern other issues, but for purposes of the present discussion, the issue is a convertible

preferred stock and the underlying security is the common stock "PHI" to which the preferred can be converted.

The data entry sheet 300 includes plural order entry rows that are divided into buy side rows 302 and sell side rows 304. Between the buy and sell side rows, a
5 current last sale price 306 is provided for the underlying common stock PHI, which can be displayed both in decimal and fractional representations as shown. The buy and sell side rows permit the customer to enter information concerning an order including a customer identifier 308, a hedge percentage 310, a move percentage 312, a versus field 314, a bid amount 316 which can be expressed in dollars (field 316a) or in points relative
10 to parity (field 316b), the size of the customer's position in the issue 318, the size of the position needed in the underlying security 320 to establish the hedge, a memo field 322, and a current bid field 324.

The customer identifier 308 identifies the particular customer who has placed the order. Depending on who is accessing the system, the customer identifier field
15 308 may or may not be viewable. For example, a convertibles trader or arbitrageur operating the system can display for its own purposes the identities of the customers for whom orders are being entered. Another user, however, would have the customer identifier 308 filtered from view preventing it from reviewing the identities of open orders of other system users. Such users can utilize the system with complete anonymity
20 and can optionally cross trade their positions within the forum created and maintained by the present invention. This field can be filled, by default, with the subscriber's name or, at the subscriber's option, with their customer's name. All users and customers have a unique assigned clearing number for trade settlement purposes, and the system accesses the clearing number when processing trades.

25 The hedge percentage 310, as understood by those with skill in the art, reflects the degree to which a convertible position is covered by a converse trade in the underlying security and also reflects the bullish or bearish nature of the hedge. It should be understood that if a hedge is set to zero, for example, by inserting the value zero in the hedge field 310 of the form 300, that such a setting is tantamount to placing an "outright"
30 order. In other words, an order to buy an issue with a zero percent hedge is an outright buy order to acquire the issue or to cover a short position whereas an order to sell an issue with a zero percent hedge is an outright sell order to sell the issue or to sell it short.

The data in any of fields 310, 318 and 320 can be calculated automatically if any two of these fields have been completed. The move percentage 312 is established by the customer, and reflects his or her judgment as to how his or her bid will vary with shifts in the underlying security. By default, the move percentage 312 is set to the value of the hedge, but that value can be overridden by the user.

Upon placing an order, the versus field 314 includes a price in the underlying security that the customer wishes to mark or price the issue against. The customer prices the issue in accordance with his or her concept of the value of that issue with respect to the price of the underlying instrument, as set in the versus field 314. Such a decision is made at the discretion of the customer, but is typically informed by a curve having a characteristic as shown in Fig. 4. The curve in Fig. 4 reflects conventional wisdom as to the relationship of the convertible to the underlying security. Similarly, standard curves are known for other instruments; See Fig. 4A for the price track of a warrant in relation to an underlying security that it can be traded (hedged up) against. The versus field 314 is populated with the last plus-tick sale price of the underlying security if the underlying security is to be sold short. Such a price is obtained, for example, based on the best last sale of the underlying security provided by an information vendor of real-time data like Bloomberg, LLP. of New York, New York. The versus field 314 is populated with the last sale price when the underlying security is to be sold long, sold short-exempt, or purchased. The versus field data can be overridden by the user at any time at the user's discretion. The bid amount 316 is conventional and well understood by those of skill in the art. Briefly, the bid reflects the amount that the customer is willing to pay to purchase the convertible. The bid can be expressed in points relative to parity, as shown in the first two rows on the buy side in column 316b, or can be expressed in dollars, as shown in the third and fourth row entries on the buy side 302 in column 316a. Once either column 316a or 316b has been populated, the other can be automatically calculated. The issue size field 318 specifies the number of shares in the issue that the customer desires to purchase. In the preferred embodiment, the common size field 320 is automatically calculated by multiplying the number of shares of the issue by the hedge percentage and by the conversion ratio for the issue in question. The conversion ratio for the issue PHI^A is 1.713, as shown in detail box 520 of Fig. 5. Thus, the number of shares of PHI needed to establish a 50% hedge, for example, in a

25,000 share position of PHI^A is $25,000 \times .50 \times 1.713$, or 21,400 shares. Alternatively, the number of shares in the underlying instrument that must be sold to establish the desired hedge can be manually entered, which causes the required hedge and move percentage values to be automatically calculated for columns 310, 312, respectively.

5 The memo field 322 can be populated with any special information about the order that the customer wishes to include such as whether the customer is long or short in the issue, whether the order is to be worked (that is filled piece-by-piece until complete throughout the trading day), etc. The memo field 322 is of particular importance when the system of the present invention is used by a convertibles trading or
10 arbitrage firm, for example, a member firm of the New York Stock Exchange so that the firm knows whether it is setting-up, turning, covering or reversing a convertible hedge for the customer. Likewise, however, the memo field 322 provides a useful reminder to customers in managing their own orders.

 The current bid field 324 shows the price that the customer has agreed to
15 pay --based on the data in fields 310-316-- to establish a position in the issue based on the current price of the underlying security shown in current quote field 306.

 The sell side 304 of the data entry form 300 substantially mirrors that of the buy side, having the same fields and same information with the exception that instead of soliciting a bid and reporting a current bid price it solicits and reports offers.

20 Turning attention now to one order in particular, a first row 330 on the buy side 302 of the data entry form is an order entered by or on behalf of customer "G," a shorthand annotation for Goldman Sachs Group, for the issue PHI^{PrA} shown in Fig. 3. A comparison to the other orders on the buy side 302 reveals that the Goldman order has the highest current bid at the common price quoted in field 306.

25 With brief reference now to Figs. 3A and 3B, data entry sheets 300A and 300B, respectively, are illustrated in an industry standard "look" format familiar to those of skill in the art. The data entry sheets 300A and 300B include fields similar to those shown in data entry form 300, like fields being designated with like reference numbers with an A or B appended thereto. The data entry forms 300A and 300B exhibit
30 symmetry: the left side to the form is for buy-side transactions, and the right side is for offer-side transactions. Throughout this disclosure, unless specificity is required for an

understanding of the preferred embodiment, "A" or "B" references may be omitted after this first use for ease of discussion.

Instead of the memo field 322, the data entry sheets 300A, 300B include indicators 340, 342, respectively, which identify whether the position is long or short.

5 For buy-side transactions, the default indication is that the position in the underlying instrument is to be sold "short", that is, the underlying instrument is being sold short to hedge up a long position in the issue in question. Likewise, in the data entry sheet 300B, the indicator 342 indicates, by default, that the position in the underlying instrument is to be sold "long".

10 The data entry forms of Figs. 3A and 3B illustrate a further feature of the present invention. In particular, buttons 350, 352 are provided for the user to input a range of hedges. This is in addition to the share percentage entered in fields 310A, 310B. This additional field allows the user to specify a range of hedges that facilitate the negotiation of price regardless of movements in the price of the underlying instrument.

15 For example, a range of hedges can allow a particular transaction to take place with little or no negotiation (discussed below). Similarly, custom move programs can be specified using buttons 354, 356 to provide the user with the ability to specify how a bid for a particular issue is to be repriced with movement in price of the underlying instrument. For example, if the common stock PHI is trading in the range 25-28 dollars per share,

20 then the move hedge percent may be specified as 100 percent. However, were the price of that underlying stock to move to the range of $28 \frac{1}{16}$ - 33 dollars per share, then the move hedge may be reduced to 84 percent. If the custom move option is utilized, the contents of the hedge field 312A are dynamically modified in accordance with any parameters that have been specified using the custom move 354 feature. Likewise, offers

25 for the issue can be revised on the offer-side in accordance with any move hedge parameters that have been specified using the move hedge button 356.

As a further feature of the present invention, a program order button 358 can be used to specify a range within which the bid remains valid. In the event that the underlying instrument trades outside of the range of valid common price levels, the bid

30 (order) can be automatically canceled. On the other hand, if the instrument trades back within the specified range, the order can be automatically reinstated. In like manner, offers can be placed and withdrawn automatically in accordance with a program specified

using the program button 360 on the offer side. This particular feature of the invention better ensures that the current swap market (as shown in the book and map pages) accurately reflects, in real-time, current interest in an issue throughout a trading day.

The data entry forms 300A, 300B further include an assigned order
5 number in fields 362, 364 which assigns a unique integer to each order as each order is placed for each swap market. Order number 362 is assigned to buy-side orders and order number 364 is assigned to sell-side orders. The data entry form further includes a navigation tool bar 370 which permits the user to scroll from the current data entry form to a previous or next form using the buttons 372 and 374, respectively. The user can also
10 scroll to and from previous and subsequent sell-side data entry forms using the buttons 376, 378. The data entry form can be closed using a button 380 on the order entry form or any standard close box, as indicated at 382. The forms of Figs. 3A and 3B are the preferred forms for placing an order, and are called-up through the graphical user interface using the "place order" button 1541A. In scrolling through the orders for
15 viewing purposes, a subscriber will see all bid and offer information that has been automatically adjusted or repriced versus the appropriate last sale information in 314A and 314B throughout the trading day. The subscriber does not see the original bid and offer information as it was entered versus the initial value in 314A and 314B. If the data sheet 300 is available, a simultaneous display of plural buy-side and sell-side orders can
20 be had without the need to scroll among individual orders. That data sheet provides a preferred form for viewing order details, for example, for viewing additional order information than is shown in the book page 500. Preferably, the order details are called-up through the graphical user interface 212 using the order details button 1541B. The subscriber can view his/her own original orders by pressing the order log button 1541C
25 on the tool bar 1530.

In accordance with further features of the present invention, the forms 300, 300A, 300B can be automatically time-stamped with the current time and date as indicated at 384. If the user modifies the order or cancels it at a later time, an updated time stamp is provided and a suitable entry is made in a log file or database. In addition,
30 the user can specify order routing instructions for a particular swap order (using buttons 386 and 388, respectively). In doing so, the customer can instruct a swap order to be routed away from the system under certain conditions, allowing for order execution to

take place outside of the system. Also, for example, if a customer has an order for a number of shares of a convertible issue and a number of shares of the underlying instrument (based on the conversion ratio and hedge) and the corresponding order being hit or taken matches up only to a limited extent, then that customer can route the remaining shares required to complete such order through the ANS 200 and to a location where the best price execution can be achieved (for example, through a ("DOT") machine. After the trade is complete, the book page, the current swap-market, and the order sheet 300 are updated accordingly. Also, order control buttons 390 are provided which permit subscribers to negotiate a particular trade using button 392, provide new bids or post bids using buttons 394A and 396A, respectively, or to cancel an order by using button 398A. Likewise, on the sell side, the customer can enter a new offer using the button 394B, post an offer button 396B or cancel an offer using button 398B. The Post Bid button 396 is used when a subscriber hits the Place Order button 1541A, which causes the order display 3A to be displayed. The order information can then be entered by the customer. The new bid button 394 is used when a subscriber is scrolling through viewing existing orders and decides to enter a new bid in that particular market. Here again, the post bid button is used to enter a new order.

The information entered in the data sheets 300, 300A, 300B, to the extent that the orders are not executed or are only partially executed, are itemized in the book page 500. As shown in Fig. 5, the book page is displayed within a frame 1510C alongside a toolbar 1530 displayed in a second frame 1520 (both frames are described below). The book page shows existing swap orders in the PHI^{PrA} market that appear in the order entry form of Fig. 3, with bids arranged in descending price order below the market bar 502, and offers arranged in ascending price order above the market bar 502. The book page 500 provides a convenient view of the current swap market for the issue in question, namely, PHI^{PrA}. Specifically, at the center of the book page and disposed along the current market bar 502 is the current last sale price of the common (PHI) 504 for that swap market. The various orders to purchase or cover the issue are arranged to the left of the current common price whereas the various orders to turn or reverse the issue are arranged to the right of the current common price. Because the buy and sell orders are arranged with bids in descending price order below the market bar 502, and offers in ascending price order above the market price bar 502, the best swap market is

typically represented by the bids and offers that fall on the current market bar 502, although a particular hedge can effect this. At the current price of the common stock (27 8/16), the Goldman Sachs Group order represents the highest current swap bid for the convertible PHI^{PrA} while the lowest price among the swap offers to sell this issue is the order placed by Reliant. This pair of orders represents the best or current swap market for PHI^{PrA} and is conveniently placed on the current market bar 502 in the center of the display. This information is also represented in a market box 602 presented on a map or summary page 600, described below.

With reference now to Fig. 5A, the process for entering an order is described. The process starts at step 542. In response to requesting a new order entry form 300, either using one of the buttons 530 or selecting a particular market box 602, a data entry sheet such as sheets 300, 300A, 300B is called up on the screen. The data entry sheet is preferably presented in a pop-up window which can be closed or unloaded and have the book page (or map page) therebelow. At step 544, the data entry sheet is automatically populated with the name of the issue that was being displayed on the book page 500 or within the market box 602 with which the user interacted to call up the data entry sheet. In addition, the subscriber name, last sale details in the underlying instrument, and other pertinent information that can be discerned are included in the data entry sheet at this step 544. At step 546, a determination is made whether the order is going to be of the bid- or offer-type. This determination can be made by monitoring the manually populated data fields in the remainder of the data entry sheet. As understood by those of skill in the art, an object oriented interface such as the graphic interface 300 need not be implemented in a strict logical order as illustrated in the flow diagram of Figure 5A; instead, events can be determined and triggered in response to interaction between the graphical interface 212 and the user. During the course of data entry, the user can always abandon the entries, or be prompted to complete any incomplete fields.

Steps 548-556 concern the process flow when the order is of type "bid". For bid type orders, the order number is automatically included within the field 362 and the subscriber name 300A is populated in the subscriber field. The user, in entering a bid-type order, is either setting up a position or covering a short position. That determination is made at step 550. In the event that the user is setting up a position, the versus field 314A is populated with the last sale plus-tick in the underlying instrument,

and field 340 indicates that the user is shorting the underlying instrument. On the other hand, if the user is covering an existing position, then the versus field will be populated with the last sale price of the underlying instrument and the field 340 will indicate that the user is long in that position. This information is indicated at steps 552 and 554, respectively. Regardless of whether the user is setting up a position or covering a short position using a bid type order, the process flow proceeds to step 556 for entry of data into the remaining fields in the data entry sheet 300 or 300A. Certain fields are required such as the hedge percentage, the move percentage, the number of shares in the underlying instrument, etc. However, the user can provide optional data such as the custom hedges moves, programs, etc., and any overrides of the previously populated fields at this step.

The handling of sell-side orders follows an analogous path. At step 558, the system automatically populates the sell-side order number field 364 and the subscriber name, and any other information that can be readily discerned at step 558. The type of the offer is discerned at step 560, the offer being an order to either turn or reverse a position. If the offer is a turn-type order, then the field 342 is populated with information "L" indicating the order instructions to sell a long position in the issue. On the other hand, if the offer is an order to reverse a position, then the field 342 is populated with "Sh" indicating that the order is to sell the issue short. In either case, the versus field 314B is populated with the last sale price in the underlying instrument. These determinations are made at steps 562 and 564, respectively. At step 566 the user inputs any remaining required data substantially as described above in connection with step 556. The process flow then proceeds from either path as shown in Fig. 5B.

Fig. 5B describes the data processing aspect of each entered order. At steps 568 and 570, respectively, the system determines whether a bid or offer already exists for that customer. If an order already exists, then the user is so advised at step 572 and provided with the opportunity to either override or cancel the existing order. If the customer elects to override the detected duplication, as determined at step 574, then the new order is posted for inclusion in the given swap market, at step 576 and the existing bid remains unchanged in the swap market. If the new order is so posted, then it will appear on the book page 500 (and perhaps within a market box 602 if it represents the best bid or best offer). On the other hand, if the customer does not wish to override the

previous order, then a determination is made at step 578 whether the new order is to be canceled. If the new order is canceled, then that is confirmed to the user at step 580 and the process ends at step 582, for example, by closing or unloading the data entry form. Otherwise, the user is again reminded at step 572 of the duplicate order and given an opportunity to override or cancel, as described above.

If an entered bid does not already exist, then a test is made at step 584 to determine whether the bid is greater than or equal to the lowest existing offer for that issue. If the bid is greater than or equal to the lowest offer for that issue, and all other pertinent criteria are matched, then the system proceeds to the steps for the process flow for trading the instrument, as indicated at step 586. Otherwise, the bid is posted for inclusion in the swap market at step 576. Likewise, for an offer, if an entered order is not a duplicate, it is then tested at step 588 to determine whether it is equal to or less than the highest bid in that particular issue. If it is less than or equal to the highest bid for that issue and all other pertinent criteria are matched, then the process flow proceeds to the trading flow diagram as indicated at step 590. Otherwise, the offer is posted for inclusion in the swap market and display in the book page 500, at step 576. Any order posted to the book page for inclusion in the existing swap market increases the liquidity of the swap market. As a result, a centralized system 200 results in which customers that are widely dispersed are apprized of and can express to others their own interest in trading otherwise thinly traded issues.

For each of the so-posted orders, the bids and offers are arranged relative to the market bar 502 as indicated at step 592. Preferably, the bids and offers are arranged using the bid price and offer price as the primary source criterion, with the order size being used as a secondary sort criterion. For example, bids can be arranged in descending price order below the market bar 502, and offers can be arranged in ascending price order relative to the market bar. Other criteria such as time can also be used for such sorting. If there are any groups that have expressed an interest in being apprized of changes in the swap market for that particular issue, then they are so apprized at step 594 of the new order (e.g., by an e-mail message, an instant message (e.g., using the America Online Instant Messenger Software), by fax or by being paged). At step 596, the user is provided with a confirmation of the entered data. At step 598, the user is returned to the

book page or map page from which he or she came, for example, by closing the data entry window.

With reference now to Fig. 6, the map or summary page 600 includes a plurality of market boxes 602, each of which provides summary data on the best swap market for a particular issue, such as for the convertible preferred stock PHI^{PrA}. At present, it is preferred that the map page be displayed within a frame 1510B alongside the toolbar 1530 in the frame 1520, described below in connection with Fig. 15. Each market box includes an issue button 604 which is denoted with the name of the particular issue or other financial instrument that can be traded in a given convertibles trading or arbitrage situation. Preferably, the bids and offers in the current swap market are periodically and automatically updated through an electronic communication link transmitted from a central server. The issue button 604, when pressed, calls up the book page 500 described above. Below the issue button is a data field 606 that shows the current price of the underlying security. The current price is preferably supplied by a direct link to an information source such as Bloomberg; however, a user can at any time override the data feed by entering (e.g., click-selecting) within the data field 600 a new value to use as a price for calculating a swap market.

To the left and right of the data field 606 are the best bid 608 and best offer 610, respectively, which represent a quote for the swap market at the current price of the underlying security (e.g., at the current price of PHI). The best bid and offer values are preferably expressed in dollars. Below the best bid and offer dollar values are the best bids and offers quoted in points relative to parity on the buy side and sell side 612, 614, respectively.

Were the user to press the issue button 604, the best bids and offers 608, 610 will appear along with the "depth" of the swap market. The best market at the current price of the underlying security appears on the current market bar 502 while the interest in the issue by other customers and at different prices of the underlying security can be discerned by reviewing the data presented in the book page 500 such as the share hedge percentage, the size and number of existing orders, and the relative balance or imbalance on the buy and sell sides. As noted above, the customer identifier may be filtered, depending on the user, so that either a customer name or give-up is identified or no customer-identifier exists.

The book page further provides as a convenience to the user a detail box 520 which provides various objective data concerning the issue including the last sale in the issue 522, a calculation of the parity value 524 in view of the current price of the underlying security, the current premium or discount 526 based on the last sale, and the conversion ratio 528. The book page also includes a plurality of buttons 530 which enable the user to move between the various display screens described herein; however, such buttons 530 are preferably implemented as a toolbar, as described below. Any issue displayed as a book page in the frame 1510C can be added to the user's map entries using an "add to map" button 540. In addition, a "trade" button 550 is provided which enables the user to hit specified bids and take specified offers, that is, trade the issue listed in the book page, directly from the book page display. Hitting bids and taking offers is described in detail in the section below entitled "Trading System".

It is the nature of financial markets that the price of the underlying securities and issues move throughout the course of the day. Therefore, the orders shown in the book page 500 must be revised with changes in the swap market for the market quotes to be meaningful. The manner in which an order is adjusted with changes in the common stock are dictated, in part, by the instructions provided by the customer when placing the order. In particular, the move percentage field 312 contains data which defines the customer's sensitivity to upward and downward shifts in the price of the underlying security. With reference now to figure 7, the price of the underlying common stock PHI^{PrA} has risen from $27 \frac{1}{2}$ (as shown in field 306 of the data entry form 300 and also in field 504 of the book page 500) to a new value of $28 \frac{1}{16}$, or $9/16$ higher. Also shown in Fig. 7 are re-computed bid and offer values for each of the orders that were placed due to the shift in the price of the underlying security. In particular, the adjustments or modifications to each bid and ask price are to effect dollar neutraling. In this case, the change in the common stock PHI ($9/16$) represents a difference value which is multiplied by the conversion ratio for PHI^{PrA} (1.713, see Fig. 5) and by the move percentage specified by the customer (100%, see Fig. 3) added to the previous bid price 47.8575 yields the new bid or offer for that particular order 48.8211.

The revised bids and offers are shown in columns 506' and 508' in the frame 1510C of fig. 7. Also illustrated in figure 7 is the revised detail box 520'. Fig. 7A,

on the other hand, shows constantly updated and adjusted values from the order that were entered in the data entry form 3A of Fig. 3.

The result of the revised prices is that the best market or swap market in the issue in question has changed, causing a new best bid and offer to be shown in the market box 602 when the map page 600 is displayed again. Thus, with reference to Figs. 3, 5 and 7, an additional effect of the upward movement in the price of the underlying security PHI can be observed. Specifically, at the common price of $27 \frac{1}{2}$, the current offer of Reliant was better than (i.e., lower than) that of Oppenheimer (represented by the symbol "OP") but as a result of the 9/16 upward movement in the price of the underlying security, and because Reliant and Oppenheimer specified different move percentage values in their respective fields 312, at the new stock price Oppenheimer now has the best offer and its order is the order represented on the sell side of the current swap market quote, that is, Oppenheimer's order is disposed on the current market bar 502'.

Continuing the present example, in the event that the Goldman Sachs Group (or the customer who placed the order through the Goldman Sachs Group) decides to take Oppenheimer's best offer 610', then a trade ticket form such as that shown in Fig. 7B is displayed, for example, in a pop-up window. The terms of Oppenheimer's offer shown in phantom box 710 are dictated by the seller and cannot be changed by the buyer (here, Goldman Sachs). However, the buyer can modify any of the fields on the buy-side within the phantom box 712 if the buyer wishes to negotiate different terms with the seller, as described below. By default, however, the phantom box 712 is populated with terms that complement the offer so that the trade can be confirmed using the button 714, or canceled using the button 716. In comparison to Goldman Sachs' original buy order for 25,000 shares, Oppenheimer is only offering to sell 22,000 shares. The trade ticket of Fig. 7B reduces Goldman Sachs' original buy order to 22,000 shares so that the terms match; however, if Goldman confirms the trade, it will have the opportunity to reduce, cancel, or leave its original bid (assuming there was one in the book page).

With reference to Fig. 8, and in accordance with a further aspect of the present invention, that order can be executed by cross-trading the Goldman Sachs revised order (in which Goldman agrees to pay the 49.7052 asking price for 22,000 shares of PHI^{PrA}) versus $28 \frac{1}{16}$ in the common PHI at the 75% hedge specified in Oppenheimer's offer) with Oppenheimer's best offer 610'.

Because the price at which the swap of the 22,000 share PHI^A position from Oppenheimer to Goldman does not correlate with a standard interval currently available with any of the major markets, the 22,000 share buy and sell orders to be crossed must be executed in two parts, with each part at a different price so that the average price of execution for the 22,000 shares is the price, 49.7052, at which the two customers instructed the trade. Fig. 8 depicts the split print situation in which the trade is executed and reported ("printed" onto the ticker tape) in two prints. The first print 802 traded 15,800 shares at 49 11/16 and the second execution print 804 traded the remaining 6,200 shares at 49 12/16. This calculation and the requirements for the two trades are preferably automatically performed. Preferably, the split print display 800 is presented in a pop-up window and can be closed by the user by clicking or touching a close box 806, or through a pull-down menu control, as understood by those of skill in the art. Each of the pop-up windows described herein can be similarly closed. The split print display 800 preferably includes additional buttons for navigating between previous, next, and new split-print displays using buttons 810, 820, 830, respectively.

With reference briefly to Fig. 7C, another example is provided, this time with Goldman taking the offers of both Reliant and Oppenheimer, as shown in the book page of Fig. 7. The trade ticket form in this example shows the weighted average price 720 calculated by multiplying the two selected offer prices in the issue times the number of issue shares offered out by each selected customer, with that product divided by the total selected issue shares offered. Stated mathematically, $(49.7729 \times 73,600 + 49.7052 \times 22,000) / 95,600$, to result in a computed average price of \$49.7573 for the total of 95,600 shares of the issue (box 722). The premium in box 724 is calculated from the dollar value in box 720, and the number of shares in the underlying security shown in box 726 is a sum of the share amounts specified in Reliant's and Oppenheimer's respective offers. The hedge percentage in box 728 is based on the share totals, and the move percentage in box 730 is a weighted average percent that can be calculated from the general equation:

$$\text{New Move\% in box 730} = \text{Move\%}_2 - ((\text{Share Amt}_1 / \text{Total Shares}) \times (\text{Move\%}_2 - \text{Move\%}_1))$$

where the subscript "1" refers to one of the orders and the subscript "2" refers to the other order, "Share Amt" refers to the number of shares being traded in the order designated by the subscript, which is a fraction of the "Total Shares" that are to be traded in the two orders. The move percent specified in box 730, therefore, can be calculated using the

5 above equation, as shown in the following examples:

$$82.7\% = (85\% - ((22,000/95,600) \times (85\% - 75\%)))$$

$$82.7\% = (75\% - ((73,600/95,600) \times (75\% - 85\%)))$$

10

Acceptable terms of the combined order are confirmed using the confirm button 714. If the trade is not acceptable to the buyer, the cancel button 716 closes the trade ticket form window without executing the trade.

As understood by those of skill in the art and as can be appreciated from

15 the foregoing two examples, the "simultaneous" crossing of the 28,300 shares of PHI and the 22,000 of PHI^A between Goldman and Oppenheimer constitutes a swap.

Because the market for the underlying security of a typical convertible hedge tends to be more liquid than that for the convertible security, the underlying security (e.g. PHI) is ordinarily traded first. In this way, the price at which the

20 convertible security should be crossed in accordance with the other instructions is determined relative to the actual execution price(s) that have been achieved.

Under an alternative scenario, the 28,300 shares of the underlying stock PHI needed to be sold short to set-up the Goldman Sachs Group convertible hedge and turn the Oppenheimer convertible hedge according to the swap order shown in row 330A

25 (see Fig. 3) might result in an average execution price of only \$27.5470 per share, as shown in the pop-up window 900 of Fig. 9. This is a different common price than that quoted in field 504' of Fig. 7 (28 1/16) causing a change in the PHI^A swap market. As a result of this downward shift in the execution price of the underlying security, dollar neutralizing demands that the price at which the PHI^A is to be traded must be adjusted

30 according to the best offer 610' shown in Fig. 7. In Fig. 10, however, the customer is able to enter in the average execution price for the underlying security so that the swap market for the average execution price can be determined. In other words, the average execution

price is used as the versus (field 606). As shown in Fig. 10 for the common stock price of 27.5470, the best offer in the convertible PHI^{PrA} is 49.0223 as compared to 49.7052 when the underlying security was at 28 1/16. Thus, while the execution price of the underlying security fell, so too did the price at which to trade the convertible preferred stock (in accordance with the swap order detail.) Goldman Sachs and Oppenheimer complete their convertible hedges by crossing the 22,000 shares of PHI^{PrA} (remember Goldman was selling short to the buyer Oppenheimer) at 49.0233 which, as explained above, requires a split print execution. In other words, the 22,000-share trade will be executed in two partial executions as shown in the pop-up window of Fig. 11.

With reference again to Fig. 9, varying execution prices of plural trades are accumulated over time, and the average price of execution is automatically computed for all shares traded in that security. The total number of trades for any given order can be tracked and reported as shown in field 902. As a convenience to the customer, the multiple executions can be settled as one net trade and the customer can be charged a commission for the net trade rather than for each individual execution. Thus, for example, while eight trades 902 were required to achieve the total required number of shares shown in field 904, the customer(s) can be sent one confirmation ticket that 28,300 shares were sold for an average price of 27.5470, as shown in field 906.

At the end of the trading day, the market closing plus-tick sale in each underlying security under consideration is manually entered into the system. The versus field 314 for each of the orders is then re-marked with this value leaving all buy and sell orders priced against the new value to facilitate business for the next trading day. This process can be automated by a direct feed of real-time last sale data from a standard source such as the information vendor Bloomberg, L.L.P. Due to trading regulations in most markets, all swap orders are entered as day orders and must be re-entered on each new trading day. The present system and method, however, can provide its users and customers with a summary statement in electronic form (e.g., to an e-mail address) which summarizes their activity for the day including orders that were filled, orders that were partially filled, and orders that went unfilled. Further, the system can obtain an electronic confirmation to repeat an order for the next trading day using the new re-marked order information from the market close, or the customer can modify the order for automatic placement the next day. Further, any unfilled order can be automatically canceled if not

confirmed by the time that the market opens on the next trading day. In addition, the system optionally can send an e-mail or instant message advising the customer of the automatic cancellation.

With reference now to figure 13, a day end summary sheet 1300 as
5 illustrated summarizes the swap markets for all issues of interest at the close of the trading day versus the last plus tick sales in the relevant underlying securities. It also provides the swap market (that is best bid and offer) for each issue in question, expressed both in dollars and in points relative to parity. This day end summary sheet can be provided to the customers by facsimile or in electronic form, such as by e-mail.

10 The operation of an arbitrage network system (ANS) of Fig. 2 in accordance with a preferred embodiment of the invention is now described with reference to Figs. 14-22.

Fig. 14 illustrates a flow diagram for logging a user onto the ANS. At step 1400, the user accesses the ANS 200 through a computer station, preferably using the
15 interface 212. The user can be a broker-dealer, hedge fund manager, NYSE arbitrage firm, or other user. Users that enter customer identifications (customer IDs) at step 1410 and those who do not enter a valid customer ID, as tested at step 1420, are provided with a limited number of opportunities to do so or be disconnected from the ANS 200. If a valid customer ID is obtained by the ANS 200, then a main screen display 1500 (see Fig.
20 15) is presented at step 1430 on an electronic display, preferably, in the form of frames 1510, 1520. From the main screen display 1500, the user can select various functions, either from the toolbar 1530 presented in the frame 1520, or from selectable-links 1560-1568 presented in the frame 1510. As understood by those of skill in the art, the functions can be represented as objects in a graphical interface environment such as the
25 ANS interface 212. Thus, functions in the toolbar 1530 can be selected at step 1440, and elements from the frame 1510 can be selected at steps 1450-1490.

In Fig. 15, the main screen display 1500 is illustrated as comprising two frames 1510, 1520, although the electronic display can include additional frames or be implemented without frames. Frame 1510 can be reconfigured to display information in
30 response to commands input by the user while the toolbar 1530 in the frame 1520 can reside on a portion of the display at all times in order to make core functions available for user selection regardless of the information displayed in the frame 1510. As will be

explained below, the particular entries in the toolbar 1530, whether the buttons 1540-1556 are active at any given time, and the response of some of the buttons (e.g., the price it button 1544) can be dynamically controlled from either the client side interface 212 or the server-side ANS 200, using Java, JavaScript, an applet, and the like.

5 In the following paragraphs, the process flows responsive to the buttons in the toolbar 1530 are discussed as well as the electronic displays presented to the user.

1. Main Functions

 The main screen display in the frame 1510A is preferably presented upon logging into the ANS 200, and whenever the button 1540 on the toolbar is pressed. The
10 main screen display includes buttons 1560-1568, which direct the user to the core functions provided by the ANS 200. When the user interface 212 is configured to permit trading through the ANS 200, the portfolio button 1560 can be activated for "upstairs" users to prevent any trades from being initiated on the floor of the exchange – a proscribed action on at least one exchange.

15 The reports button 1562 provides the user with standard or custom reports concerning the issues being monitored by the user, the most active issues being monitored on the system, the issues being traded by the user, the most active issues being traded on the system, and closing summary reports such as the fact sheet 1300 (see Fig. 13). These reports may be provided as either a fee or free service to ANS users. A
20 "transaction" report, for example, reports and optionally graphs transactions in accordance with predetermined criteria. The predetermined criteria can specify which issues to report on, for which customer, and the time frame of interest (Day/Week/Month/Year/Year to Date). An "interest in" report, for example, can provide similar information concerning bid and offer activity in one or more issues, for one or
25 more customers, over prescribed time periods. A "commission" report also can be generated using the same predetermined criteria. New reports (and graphs) can be generated and viewed, and all reports (and graphs) can be retrieved from a data store for viewing and reviewing. Custom reports can be fashioned by obtaining report criteria from the user, preferably by completing a form or checklist provided on the electronic
30 display at the user's station.

 The Map button 1564 provides the user with a display of the map page 600 within the frame 1510 (namely, as frame 1510B), described above. The same result

can be had by selecting the button 1542 from the toolbar 1530, whether the main screen display 1510A is being displayed or not.

The user information button 1566 provides, among other system services, the ability to contact the ANS server manager or the like regarding database assistance, obtain general and technical support, change passwords and other connection protocols, obtain and search for help on various topics, and learn more about the ANS, its personnel, press releases, and other information.

The log off button 1568 disconnects or locks up the user station until a new session is established as described above in connection with Fig. 14.

10 2. Place Order Function

The place order button 1541A causes the data entry sheets 300, 300A, or 300B to be displayed through the graphical interface 212. The user completes the form as described above and posts it using the buttons 396A, 396B to the ANS 200.

15 3. The Order Details Button

The order details button 1541B causes the order entry form 300 to be displayed. This display shows the details of the current market in a particular issue. The market that is displayed will be the current issue displayed in the book page 500, or the market highlighted in the map page 600, and if not otherwise identifiable, the ANS 200 prompts the user to identify the issue for which the details are to be displayed.

20 4. The Order Log Button

The order log button 1541C provides details of the original orders placed by that user. This information is not available to other users through the ANS 200; however, data concerning these orders can be stored or processed for other purposes by the ANS 200.

25 5. Map Functions

The Map buttons 1542 and 1564 cause the map page 600 to be displayed in the frame 1510 as frame 1510B (see Fig. 6). The map page provides a simultaneous display of the current swap market in a variety of issues, each being portrayed in a separate market box 602. The user can review the details or inside market on any issue displayed in the map page by selecting the issue button 604. The user can also set up different map pages to track a variety of different swap markets or different combinations of swap markets, for example, a combination or arrangement that the user wishes to

display simultaneously on a particular map page 600. The user can scroll back and forth among map pages using the previous and next buttons 620, 630, respectively.

Through the interface 212, the user can arrange the issues to be displayed or not displayed in the map page 600 in accordance with his or her preferences. For example, the order of the market boxes 602 can be changed by dragging a particular market box to a new location in the frame 1510B with all other market boxes shifting accordingly, e.g., to the left and upwards. This can be done, for example, (1) by selecting the market box by clicking a mouse button within its boundaries and then moving the mouse while the button remains pressed, (2) by touching and sliding one's finger in a touch-sensitive arrangement, (3) by a non-graphical interface method as understood by persons of skill in the art. Also, a particular market box for an issue that is being monitored can be ordinarily hidden from view and displayed only at the instruction of the user. This feature permits the user to exclude others from observing the issues of interest to that user and has particular utility when the user station is located in a generally public place, such as at a station on the floor of an exchange.

The user can also add issues to and delete issues from their map pages using the add swap market button 640 and delete button 650, respectively. Initially, the user can populate the map page 600 by adding issues using the add swap market button 640. When adding a swap market, the user provides the name of the issue to add and the ANS 200 determines if that issue is already in the map page. If it is, then a suitable dialog box is presented and no further action is taken. If the issue is not already in the map page, the ANS then determines whether the issue is known to its database. If the issue is recognized, then the market box for that issue is displayed in the map page 600, for example, in the next available space 660. If the issue is not recognized, the user is prompted to provide information concerning the underlying instrument against which the issue is to be traded, and to provide any further information concerning the user's trading strategy for that issue (e.g., the move percent data, hedge, versus, and bid or points relative to parity), using a form such as shown in Figs. 3A and 3B. The ANS can automatically obtain or prompt the user for the conversion ratio, strike price, or other related figure that is required to automatically calculate the swap market, using formulae that are well understood in the art. Once the ANS has obtained all of the relevant information for calculating the swap market in that issue, the user is returned to the map

page or the overlying form is closed (unloaded) so that the added issue now can be displayed. Thereafter, the user can delete any market box 602 by selecting such market box (so that it is highlighted or otherwise identified) and then pressing the delete button 650.

5 6. Price It Functions

The price it button 1544 provides an expedient way to view a swap market in a particular issue with a manually entered price for the underlying instrument. With reference now to Figs. 16 and 17, the frame 1510D contains a "price it" display including a single market box 602. At step 1710, such a market box is displayed.

10 At step 1724, the market to be priced is obtained, in other words, the name of the issue is obtained. This can be done automatically when the system has a basis for inferring which issue is of interest. For example, if the user selects the price it function from the map page with a particular issue highlighted or otherwise selected, then the issue button 604 preferably defaults to that issue. If the automatic selection resulted in
15 the wrong issue being selected, or if there is no basis for the ANS to make such a selection, the user can enter the issue either by selecting or touching the issue button 604, by selecting from a pull-down or displayed list 1604, or by responding to suitable system prompts.

At step 1726, the ANS obtains the price for the underlying security. This
20 is a manual data entry step, with the price being entered in the data field 606, for example, by clicking or touching that field and entering the data using a keypad or touchpad, such as the touchpad 1656 of Fig. 16A which includes numbers from 0-9, and fractional values and/or a decimal point. Once the issue and price have been obtained, the remaining fields 608-614 in the market box 602 can be populated at step 1730 to
25 thereby price the issue of interest (field 604). The populated fields are illustrated in Fig. 16, along with the symbol 1620 and price 1630 of the underlying instrument for the issue of interest.

The touchpad 1656 is a pop-up display that can be superimposed as a foreground window and displayed over any other screen display by pressing the touchpad
30 button 1556. A touchpad 1656A may include further touchpoints, also shown in Fig. 16A. The touchpad 1656 includes, for example, a client name touchpoint 1660 and a text

entry touchpoint 1670 that are both used to enter alphabetic text such as "Merrill" or "Oppenheimer" or "KM^T" or "PHI^{PrA}" (conventionally entered as "KM.T" and "PHI.A").

The user can price the same issue at another price or price another issue, for example, by pressing an "another price" button 1640 or an "another market" button 1650, respectively. The process flow of Fig. 17 determines whether another price or market has been selected and responds at step 1730 with newly populated fields. If no other pricing function is desired, the user can use the toolbar buttons 1540-1554 to select a next function and/or display.

7. Advertise Market Functions

There are occasions in which particular subscribers may wish to advertise a particular swap market that may be of interest to certain other subscribers, including "upstairs" traders, those individuals who are not located on any of the stock exchange floors such as the NYSE. The "advertise market" button 1546 enables users to direct messages to other subscribers to advertise such markets. A fee is preferably assessed for the use of this feature to provide a source of revenue to the ANS and to discourage overuse of this feature.

The form used by a user desirous of posting an advertisement preferably is arranged in the same manner as the advertisement that is delivered to other subscribers (a what-you-see-is-what-you-get format). Fig. 18 illustrates a form/advertisement in accordance with this feature of the invention. The advertisement includes a market box 602 substantially as described above. The fields in the market box can be populated in accordance with the process flow of Fig. 19.

(a) Advertisement Creation

At step 1900, the customer ID of the user who is creating the advertisement is logged by the system for tracking and billing purposes. At step 1910, an empty market box 602 (see market box 660 of Fig. 6) is displayed. The user enters the market to advertise, in other words, the name of the issue of interest, at step 1920. The issue of interest in the advertisement of Fig. 18, for example, is KM^T. The current market price for the underlying instrument (the stock of K-Mart, symbol KM) is automatically entered into the data field 606 and the best swap market at that current market price are then populated into the fields 608-614 to define the current swap market for the issue of interest.

At step 1940, using a form or group list (not shown), the user provides the names or e-mail/network addresses of the subscribers or groups to whom the advertisement is to be sent. This can be simply filling-in and submitting a text-box form created with HTML tags. The advertisement is then sent to the designated subscribers and groups at step 1950, and the entire transaction is logged at step 1960. Preferably, a transaction number is assigned to this event and correlated with the customer ID of the sender (the user identified at step 1900) for billing and tracking purposes. The transaction is confirmed to the user at step 1970, and then the user can select a further function from either the main screen display 1510A, or from the toolbar 1530, at step 1980. The creation and management of an e-mail group list is conventional and understood by those of skill in the art. The group members are all users of the ANS 200 system.

(b) Advertisement Viewing

From time-to-time, users may receive advertisements of the type described above. Such advertisements can take the form of a pop-up window or may comprise the frame 1510E. In either event, an advertisement such as the advertisement 1800 when received by the designated subscribers or groups, include a "show book" button 1810, an "add to map" button 1820, and a "close advertisement" button 1830. The show book button 1810 permits each recipient to display the book for the advertised issue. In other words, the recipient can review the inside details or current interest in the issue. Using the "add to map" button 1820 (each recipient to add the issue to the various issues that are displayed when the map page 600 is displayed.) Thus, the issue KM^T, if added to the user's map of Fig. 6, will be displayed in the open space of the market box 660. The close advertisement button 1830 clears the advertisement from the recipient's screen. Preferably, showing the book or adding the issue to the recipient's map causes the advertisement to close automatically. (The user can add the issue to his or her map from the book page using the "add to map button" 540.)

(c) Advertisement Tracking

As noted above, users are preferably assessed a fee for distributing advertisements to other subscribers. The fee for creating the advertisement can vary with the type of issue, the number of recipients, additional factors, and combinations of these factors. Further, the user who creates the advertisement can be provided with data

indicative of the response to the advertisement due to the interactivity provided by the ANS.

With reference now to Fig. 20, the ANS 200 can periodically commence a review of the advertisements that are sent to various subscribers. At step 2010, a particular transaction is selected so that the responses of the recipients can be tabulated. The nature of the response of the recipients can be tabulated at steps 2020-2040 to define feedback reports which identify how many of the recipients pressed the "show book" button 1810 or the "add to map" button 1820 or merely pressed the "close advertisement" button 1830. A different fee can be assessed for providing each such tabulated report, using a fee schedule that is accessed at step 2050. The user can request one or more of these feedback reports at step 2060, for example, by pressing the reports button 1562 from the main screen display. These reports are then provided to the user at step 2070 and the user is billed in accordance with the prevailing pricing criteria for such reports.

8. Send Message Functions

There can be occasions in which users desire to send messages to other subscribers. The send message button 1548 can cause a message form to pop-up, which the user can complete and send to particular recipients. The system can restrict to whom user's can send messages. For example, users at Goldman Sachs may be restricted from sending messages to persons at Oppenheimer and vice versa. However, Goldman Sachs users can be enabled to send messages to one another through their respective user interfaces 212 using the ANS 200. The message system can be implemented using a standard e-mail interface, and may be enhanced to permit anonymous messages to be sent to designated recipients and perhaps allow the recipients to respond to the unidentified sender.

9. Average Price Functions

The average price button 1550 can be used to manually call up the average price display described above in connection with Fig. 9. With reference now to Fig. 21, a flow for determining whether to call up the average price display commences at step 2100. At step 2110, a test is made to determine whether two or more partial executions (trades) were made against the same order to fill the order and whether the trades resulted in a new average price. If not, then a test is made at step 2120 to determine whether the

average price button 1550 was pressed. If that button was not pressed, the system awaits one of those events to proceed further. As noted above, these tests are typically event-driven in graphical interface environments in which users interact with objects such as the average price button, and so the logical flow is to be understood as facilitating the present discussion and not being limited by the way in which the system and method of the present invention works. Thus, when a new average price or the press of the average price button 1550 is detected, the flow advances and ultimately causes the average price window 900 to be displayed.

In the case of a new average price being detected, the system 200 obtains either the swap trades (that is, the two instruments being traded) or an individual security that is being traded that are being executed to fill an order, as shown at step 2130. The system 200 then determines the average price for all of the instruments being traded to fill an order, as well as the total number of shares traded and the total number of trades concerned, at step 2140. The average price is computed as the sum of the number of shares in each trade times the price of the shares in such trades with the product being divided by the total number of shares traded. For a series of trades of different sizes at different prices (as shown in Fig. 9), the computation can rapidly become complex, is prone to error when done manually, and any additional trade must be factored in anew, and not engrafted to a previous result. At step 2150, these results are logged in a database for viewing, reporting, settlement, and other purposes. The resulting price and trade information are displayed in the average price window 900, at step 2160.

In the case of the user pressing the average price button 1550, the system 200 obtains, for each of a series of trades, the number of shares and price at which such shares were traded at step 2170. Thereafter, the process proceeds at step 2140 determining the average price and other data derived from the trades obtained at step 2170, logs the data at step 2150, and displays it at step 2160.

At any time that the average price window 900 is open, the user can scroll between previous and next average price windows, or open a new window (which is equivalent to pressing the average price button 1550), using the buttons 910, 920, and 930, respectively. The previous average price button displays to the user the average price before the last transaction. For example, if the average price per share after three trades was \$20.25, the user can use the previous page button 910 to call up the average price per

share after two trades, say, \$20.50. In this way, the user can view the average price per share at any given time as is desired, and permits the transactions in a series of transactions to be reviewed to inspect how the price of execution for a particular order has changed with each transaction. The previous button 910 can also call up the average price per share for transactions concerning other orders.

10. Split Print Functions

The split print button 1552 enables a user to activate the split print function from which the user can manually determine the two execution prices needed to achieve a particular non-industry standard price increment for a specified number of shares. The split print display 800 was described above in connection with Fig. 8. That display can be automatically invoked when a specific price and size of the two individual trades (conforming to the relevant trading increments such as the NYSE increments of 1/16 of one dollar) needed to achieve a single desired execution price for a specified number of shares. The split print display 800 was described above in connection with Fig. 8. That display can be automatically invoked when a specific price is needed to hit a bid or take an offer. With reference now to Fig. 22, a new split print (execution) is automatically invoked at step 2210 when required to achieve a specific price in a trade being handled by the system, and can be manually invoked, as indicated at step 2220, to determine the number of shares and price to satisfy the customer's inquiry. Otherwise, the system 200 waits and does not display the split print display 800 until an appropriate event is detected.

At step 2230, the system obtains order details including the name of the instrument being traded, the price and quantity of the shares being traded. At step 2240, the system then determines how to break up the order into preferably only two round-lot executions and the price required in order to match the average agreed upon price within prescribed limits (e.g., a 100th of a cent). These determinations are logged into a database at step 2250, and the data is displayed in the split print display 800, at step 2260.

11. Calculator Functions

A pop-up calculator can be provided as an additional tool in response to pressing the button 1554. The pop-up calculator preferably is in the form of a touch pad entry panel within a user-closeable window with the integers 0-9, a decimal point, various fractions corresponding to the intervals at which instruments are traded (e.g.,

sixteenths, or tenths), and basic arithmetic function keys such as addition, subtraction, division, and multiplication, and perhaps a memory.

12. Touch Pad Function

The touch pad is illustrated in Fig. 16A and was described above.
5 Preferably, the touch pad is displayed using the graphical user interface 212 in a resizable window which can be opened (or loaded) and closed (or unloaded) at the user's command using the "TouchEnt" button 1556 or automatically, for example, whenever the user calls up a data entry form to enter an order.

Trading System

10 With reference now to Figs. 23-26, the trading system that complements the order management functionality described above is described in detail.

From the book page 500, users are presented with a listing of the open (unexecuted or remaining portions of) orders on both the buy- and sell-side for a particular issue. These orders represent the current swap market known to the system 200
15 in that issue, for example, the current swap market for the issue PHI^{PrA}. In accordance with a salient feature of the invention, the user can not only review the orders behind the best swap market (shown in the market box 602, e.g., on the map page 600), but can negotiate and/or trade the issue in question using the graphical interface 212 and the system 200.

20 In the basic case, the user simply selects one or more bids or offers from the book page through the graphical interface, for example, by touching the display at the location where the bid or offer of a specific customer is displayed or by click-selecting that location using a mouse, trackball or joystick. With reference again to the prior example, if the aggressor (the customer hitting a bid or taking an offer) is Goldman (a
25 subscriber), Goldman selects the Oppenheimer offer of 49.7052 by touching that row entry in the book page 500 of Fig. 7. In this example, Goldman is aggressively taking Oppenheimer's offer (the provider of liquidity by adding an order to the market), which is the best offer presently in the swap market for PHI^{PrA}. With reference to the flow diagram of Fig. 23, these actions occur at step 2302. In a more complex scenario,
30 described below, the user might select more than one offer from which to take shares of that issue (that is, PHI^{PrA}) in accordance with the applicable rules and regulations of the marketplace.

Once the bids and offers have been selected (identified to the system), the user presses the trade button 550 to commence the trading and/or negotiation. Until the trade button is pressed, the system awaits any further selections of bids/offers, or de-
 selections of bids/offers. When the trade button is pressed, as tested at step 2304, any
 5 trading preferences established by the selected customer are obtained at step 2306. Trading preferences can be in the form of a rule base that governs, for example, how multiple offers being taken are to be divided. One such rule can specify that offers taken should be in share amounts necessary to automatically satisfy the aggressor's hedge. Another such rule can specify that liquidator's positions are to be taken at the lowest
 10 price offered until each such liquidator's position is exhausted rather than splitting evenly among two or more selected liquidators. Similar rules can be established for an aggressor when the customer is on the offer side of the transaction.

Once any customer-specific rules have been obtained, a trade ticket form can be automatically populated with data from the selected bid(s) or offer(s) and the
 15 corresponding aggressor's information, as indicated at step 2308. An exemplary trade ticket form is illustrated in Fig. 24-1A. This trade ticket form includes data which is automatically included in the form from the data entry sheets 300 and/or book page 500 such as the information indicated in the groupings 2410-40, indicated in lines, as well as the current price of the underlying instrument, indicated at 314A. The groupings include
 20 the basic trade information such as the name of the issue, the time that the swap order is posted, the customer name, the bids and offers for the issue quoted in both dollar prices and points relative to parity, the number of shares of the issue and underlying instrument in the selected orders, and the hedge and move values. The user can cancel or modify the contents of the trade ticket that were automatically placed into the form, for example, the
 25 user can change the identity of the customer in fields 308A or 308B, to the extent permitted by the ECN, and can change the number of shares of the issue to be traded specified in fields 318A or 318B by selecting those fields directly and providing a new value, as indicated at steps 2310-14 and as shown in Fig. 24-1B where Goldman has reduced the number of shares from 73,600 to 25,000. Of course, the user can only
 30 modify the bid if he or she is taking the offer and can only modify the offer if he or she is hitting the bid. If the transaction is canceled at step 2312, the user is returned to the book page at step 2316. The completed state of the ticket is tested at step 2318. If the

ticket is incomplete or incorrectly completed, the user is given the opportunity to provide new values at step 2314. Otherwise, if the ticket is fully completed, the user confirms the trade is to proceed or be negotiated at step 2320. The user confirms the completed ticket using the button 2450, or negotiates a trade using button 2460 on the trade ticket form

5 2400.

It may be that the same customer has existing bids/offers in the book that may bear on the present transaction. At step 2322, the user is advised of this and again given the opportunity to modify or cancel the present trade or another open order. If the customer elects to proceed, a determination is then made whether the trade can be

10 automatically executed, that is, the system determines whether the two customers have the same hedge (or whether the customer's rules tolerate the hedge difference within the limits of the proposed trade), at step 2324. If the customers have the same hedge, the trade proceeds automatically (step 2326), as described with reference to Fig. 25 below. Otherwise, the customers go into negotiation, also as described below with reference to

15 Fig. 26 (step 2328).

EXAMPLE 1

Assume that Goldman decided to take 25,000 shares of Reliant's offer at Reliant's hedge of 92% (despite the terms of Goldman's earlier order that included a

20 100% hedge). Goldman can make that selection, for example, by touching the entry 610 in the book page 500 and then touching the trade button 550. This results in the trade ticket form of Fig. 24-1A being displayed through the graphical user interface 212. In order to take only 25,000 shares of Reliant's offer to sell 73,600, the user at the Goldman station reduces the bid (that is, the number of shares in box 318A) to 25,000 at around

25 10:30 A.M., in this example, as shown in Fig. 24-1B and then presses the confirm button 2450 (also referred to as button 714). The order is then executed at 10:32 A.M. without further manual intervention, as shown in Fig. 24-1C (also known as the trade confirmation). The remainder of Reliant's offer is then automatically reduced, as shown in the data entry form of Fig. 24-1D.

30 Note that a cross trade of 25,000 shares of PHI^A occurs along with a simultaneous cross trade of 39,400 shares of PHI. This transaction satisfies part of Reliant's swap order leaving an offer of 48,600 shares at the 92% hedge. As a result of

the trade of Fig. 24-1C, however, Goldman has set up a position of 25,000 shares of PHI^A at a 92% hedge whereas it had a 100% hedge strategy. To rectify the hedge to 100%, Goldman must sell short an additional 3,800 shares. As described herein, the proposed embodiment allows for automatic routing of peripheral orders like this one, so that the order is satisfied within the ANS 200 or at another location where the best price execution can be achieved

EXAMPLE 2

With reference to Figs. 24-2B and 24-2C, Goldman again takes the offer made by Reliant as shown in Fig 24-1A, but in this transaction, Goldman proposes different terms which require negotiation between the buyer and seller which can be achieved in the preferred embodiment of the invention without intervention of a third party.

In Fig. 24-2B, Goldman modifies the hedge and move to propose a purchase of 25,000 shares of Reliant's larger sell order at a different hedge percent. Because the terms on the buy- and sell-sides do not match, the system disables the confirm button 2450 and instead activates the negotiate button. Upon selecting "negotiate", Reliant is presented with advice that a trade can be accepted on the terms proposed by the buyer (whose identity need not be disclosed as of yet) by accepting the trade. If Reliant accepts the trade by agreeing to change its hedge and move data, the trade will proceed and the book page 500 will be updated. Otherwise, Reliant can reject the proposed terms, and if the proposal is rejected or declined, Goldman can either not trade with Reliant or can trade at Reliant's hedge of 92%.

EXAMPLE 3

Continuing the scenario of Example 2, assuming that Reliant accepted Goldman's bid, its original order can be automatically reduced by 25,000 shares, as indicated in the data entry form of Fig. 24-2D.

EXAMPLE 4

As in Example 2, assume that Reliant accepted Goldman's bid, and that Reliant has a custom program to automatically maintain a hedge specified in a user-

entered order. As a result of this program, the original order is automatically reduced by 25,000 shares of the issue, as indicated in the data entry form of Fig. 24-2E, and the number of underlying shares is changed to maintain the hedge as portions of the original order are filled. Thus, instead of 76,600 shares of the underlying issue, Reliant only
5 needs to sell 73,200 to reverse its position. This number can be calculated by subtracting the number of shares of the underlying shares that have already been sold. The move percentage can then be calculated automatically.

EXAMPLE 5

10 Fig. 24-3A illustrates a situation that arises when the best bid and best offer 608, 610 are selected, for example, from the book page 500, and a trade is requested (e.g., by pressing the trade button 550). Because the terms on the buy- and sell-sides do not match up, Goldman must negotiate the trade using the negotiate button. It should be understood that Reliant or some other entity could initiate the trade from either the buy-
15 or sell-side.

In Fig. 24-3B, Reliant has received Goldman's proposed trade and has come down in price and increased its hedge. In Fig. 24-3C, Goldman decides to pay up, which means that the bid is adjusted to match the offer in both price and hedge. With the terms now matching, Goldman can confirm the trade using the confirm button 2450.
20 Thereafter, the trade occurs and both parties are separately prompted to reduce, cancel, or leave pending their original orders.

With reference now to Fig. 25 (see also 586 and 590 of Fig. 5B), once a trade is instructed, and all other order criteria are satisfied including primarily the hedge,
25 the orders from the buy-side and sell-side of the book page are matched and routed to an executing agent, as indicated at step 2510. The executing agent receives the matched orders and executes them in a conventional manner at step 2520. The ANS 200 accesses a fee schedule or database at step 2530 which prescribes the fees applicable to those customers, for the number of shares being traded and at the price that such shares are being traded. The fees assessed to the customers may be value-based (e.g., 1 basis point
30 (.01%) using the value of the transaction (Total Shares x Price) or share-based (e.g., 1¢ per share). The trade or event is logged within the system as well as any fees that are

assessed to the customers and/or users of the system 200 that were involved in that trade, at step 2540. The book page is then updated at step 2550 to remove those orders from both sides of the book, or to reduce the size of a larger order to reflect the leaves. Confirmations are provided to the customers at step 2560, and any "keep up" groups are
5 apprized of the trade and resulting change to the swap market at step 2570. A keep up group includes various users who have requested that they be provided with electronic messages concerning actual trades and/or changes in the liquidity of a given swap market.

In Fig. 26, a negotiation process is illustrated by which two customers can exchange messages with proposed trade details in order to resolve differences in hedge
10 percentage data. As should be understood, the difference in their respective hedges results in different common stock amounts that each customer must trade to establish a desired convertible hedge. Such discrepancies result in one customer having its order completely satisfied while the other would only be satisfied to a limited extent. In such a situation, a swap would satisfy the hedge requirements of the limited customers who
15 must instead seek an additional trade of the common stock to satisfy the hedge. However, in the preferred embodiment, hedge differences can be negotiated in an attempt to satisfy both orders with a single trade. To the extent that either customer is unsatisfied with the proposed hedge, the customers can still trade and then adjust their hedges in a conventional manner through a separate trade of the underlying component.

20 At step 2610, the system 200 obtains the number of shares for the underlying instrument (e.g., a common stock like PHI) and/or the hedge for a proposed trade by either the aggressor or the liquidator. That information is conveyed in an anonymous message to the other party at step 2620. The recipient is provided with a predetermined period of time to respond, for example, thirty seconds. After the passage
25 of the predetermined time period, a test is made as to whether a response was sent at step 2630, and if not, the aggressor is advised that there was no response at step 2640 and the process flow shifts to present the trade ticket form, at step 2330, to permit the customer to modify the ticket and thereafter negotiate or trade. (Follow the labels "N" from Fig. 26 to Fig. 23.) On the other hand, if a response was sent, a test is made whether the
30 liquidator accepted the proposed trade at step 2650, and if so the trade proceeds automatically as described above in connection with Fig. 25, and if not the aggressor is

advised at step 2660 that the proposed trade was rejected, and the process flow again shifts to step 2330 of Fig. 23.

From the foregoing, it should be appreciated that various features and different levels of functionality in accordance with the invention can be realized in different embodiments thereof. At a most basic level of automation, an order management system can be implemented on a stand-alone computer operated by one or more firms associated with an exchange, such as by convertibles trading firms and arbitrage firms. As illustrated in Fig. 27, for example, an automated order management system in accordance with the invention can comprise a software program running on a computer 2710 which is configured to display and manage the data described above in connection with Figs. 3 and 5-13. The software program is configured for each subscriber's private use, and includes only the swap orders provided by a particular firm's customers. Thus, for example, a book page 2720 for a particular issue that is maintained by a first firm 2730 (e.g., for the issue PHI^{PrA}) will differ from a book page 2740 for the same issue being maintained by another firm 2750 (using the same software program on a different computer 2760) because each firm has information concerning the swap market only for its respective customers. Such an automated system improves on conventional methods for managing swap orders and can be communicatively connected to live data feeds for real-time updates of the swap market managed by such firms. Such an order management system maintain's each subscriber's information proprietary without providing a competing firm with information concerning the swap markets that it is managing and need not empower the subscriber to trade the swap orders through the system.

With reference now to Fig. 28, the ANS 200 is programmed to operate on an ANS server 2810 which is connected through a distributed computer network 2820, such as a wide area network (WAN), to a plurality of users including subscribers 2830A, 2830B (only two shown, subscribers S1 and S2) and a plurality of firms 2840A, 2840B (only two shown, firms A1 and A2). Each user runs system software in accordance with the invention on a computer 2850 of a type which can be connected to the ANS server 2810 through the network 2820 or other standard communication link. For example, each of the computers 2850 (and other computers referenced hereinabove) can be a machine having a Pentium III processor made by Intel Corporation of Santa Clara,

California as its central processing unit and Windows NT made by Microsoft Corporation of Redmond, Washington as its operating system. Such machines, as well as faster models, are commercially available from a variety of suppliers such as Dell Computer Corporation of Austin, Texas and are conventionally bundled together with an operating system. The system software running on the computers 2850 and the program running on the server 2810 cooperate to implement shared swap-order management and information exchange.

The network connection of the computers 2850 permits information to be shared by and between the users 2830, 2840 thereby making the swap market in a given issue more efficient. The subscriber S1 dealing with the firm A1 conventionally has not had information concerning the state of a swap market being managed by the firm A2. However, through the network 2820, the subscriber S1 can display on a display connected to the computer 2850 the swap market for a given issue including the orders entered by all users connected to the ANS server 2810. Preferably, the software resident at each local computer 2850, with the assistance of a real-time stock-price data feed, continuously updates the swap market to arrange the pending orders, for example, so that the best swap market is aligned with the market bar 502, as described above.

With further reference to Fig. 28, the swap market for PHI^{PrA} is displayed at a station of subscriber S1. The current market, as illustrated, includes two bids and two offers, including a best bid and a best offer. If the subscriber S1 is Merrill Lynch, for example, then any orders placed by that subscriber can be identified on the display as a "Merrill" order. However, that subscriber's identity is preferably not revealed to other users except perhaps to an arbitrage firm such as firm A1 that subscriber S1 has granted such authority. Thus, for example, the Merrill order can be identified as a Merrill-originated order at firm A1 and as an order from subscriber S1 at other firms A2 and at other subscriber stations S2, as shown. This is achieved by a filtering process implemented by the ANS server 2810. After each order is entered, it is preferably conveyed through the network 2820 to the ANS server 2810 for processing prior to being forwarded to each of the users 2830, 2840. The ANS server 2810 filters the orders to protect the identity of the user that entered a particular order so that only those other users that have permission to see a given user's identity can do so. In this way, an order entered by subscriber S2 (e.g., Goldman Sachs Group), appears on S2's display (and at

any other authorized station such as A2) as "G" for Goldman but appears only as "S2" on S1's display so that Goldman's identity is not revealed, as shown in Fig. 28. A non-subscribing customer of a particular firm is preferably identified at that firm's station by that customer's name (e.g., "REL" for Reliant Capital as shown on the display of firm A2), and identified as "A2" at all other stations.

The arrangement of Fig. 28 enables efficient management of swap orders through a common computer network, but need not enable trading of the orders themselves. If no trading functionality is provided, then in the event that a user wishes to hit a particular bid or take a particular offer, the user selects the order from the display screen using a mouse, touch screen, or other selection device, and the ANS server 2810 preferably responds by identifying the convertibles firm or arbitrage firm that is holding the order or by contacting that firm directly.

With reference now to Fig. 29, a highly-automated embodiment of the invention is illustrated. In the embodiment of Fig. 29, a plurality of subscribers 2930A, 2930B, ... (only two shown, subscribers S1 and S2) each have computers 2950 which are interconnected to an ANS server 2910 through a network 2920 such as a wide area network. The subscribers communicate directly with one another through the arbitrage network system server 2910 and can display, at their respective stations, the current swap market in a variety of issues, exchange information (such as the advertise market function (see discussion regarding button 1546)), and execute orders directly with other subscribers. As in the embodiment of Fig. 28, the identity of individual users or subscribers can be masked from other users. The ANS server 2910 is a trusted server which maintains the identities of each user in confidence and enables communication and trading therebetween. Because the ANS server 2910 is the only machine that knows the identity of all users, it is uniquely able to connect a given aggressor with a given liquidator. For example, subscriber S1 in Fig. 29 (e.g., Merrill Lynch) can view the current swap market in PHI^{PrA}, including all of the information shown on the book page 500 discussed above except for the source of the order, unless of course Merrill is the source. Likewise, if Goldman Sachs Group is subscriber S2, that subscriber can view all of the information on the same book page but will not see, for example, that Merrill is the source of the best bid in that issue. As a result, the ANS server 2910 can respond to subscriber requests to hit a bid or take an offer by executing the trade directly, free of any

intermediary acting in an agency capacity for such subscribers, or by enabling a confidential negotiation session as described above.

In a particularly preferred arrangement, the trading system of Figs. 28 and 29 can be used to automatically process orders without negotiation even in situations in which the aggressor and liquidator specify differing hedges. In such an arrangement, the aggressor (e.g., Goldman from Example 2) can specify a different hedge and the system can accommodate the difference in the number of shares of the underlying security in each parties' hedge through a separate trade to account for that difference in hedge. That difference in hedge can be accommodated, for example, by posting an order for the residual shares of the underlying security that need to be traded to satisfy the terms of the order placed by either the aggressor or the liquidator. That order is preferably posted electronically, without manual intervention, to an electronic trading network such as the SuperDOT system made available by the New York Stock Exchange.

Thus, with reference to Fig. 30, a customer/subscriber can view a plurality of pending orders at step 3010 through the display provided by the ANS interface 212. As previously described, the subscriber selects an order at step 3015 which has a hedge which is anywhere from zero percent (an outright order, and hence not technically a "swap order") to 100 or more percent. This preferably causes a trade ticket form such as the exemplary form of Fig. 24-1A to appear in a pop-up display with the data fields automatically populated with the information from the selected order. At step 3020, the subscriber is permitted to modify the terms of the order, including the data in the hedge field, also as previously described.

In the event that the subscriber modifies the hedge that was specified in the selected order (e.g., changes the 92% hedge specified by Reliant to, say, 100%), that second hedge entered by Goldman will differ from the first hedge specified by Reliant. At step 3025, the hedges that are on the buy and sell side of the transaction, for example, as entered into the trade ticket 2400, are tested for equality. If the hedges are equal, the swap is executed at step 3030. This occurs if, after selecting or modifying the hedge data in field 310, the hedge is the same as specified in the selected order at the time that the confirmation button 2450 is pressed. On the other hand, if the hedges differ, the smaller of the two is a limiting hedge in the swap trade. In other words, the smaller hedge

represents a lower number of shares in the underlying security that need to be traded to satisfy that hedge. If the only difference between the selected swap order of the liquidator and the aggressor's order is the size of the hedge, then the order with the smaller hedge is cross-traded through the ANS server 2810, 2910 with the other order, and the
5 difference is filled outside the ANS.

Thus, with further reference to Fig. 30, a test is made at step 3040 to determine whether the selected order specifies a hedge which is smaller than that specified in the order that was modified by the subscriber at step 3020. If the selected order has a smaller hedge, then that hedge defines the limiting hedge which is cross
10 traded through the ANS server. This is represented, at step 3045, by setting the limiting hedge to be equal to H1, the hedge of the selected order. In the event that the subscriber modified the order to have a smaller hedge, then the limiting hedge is set at step 3050 to be equal to H2, the hedge of the subscriber-modified order. At step 3055, the residual component of the hedge that cannot be satisfied by cross-trading the two orders within
15 the ANS is computed as being equal to the absolute value of the difference between the two hedges. This value can be determined in a variety of ways, as understood by those of skill in the art.

At step 3060, the order with the smaller hedge is cross traded and fully satisfied by the order having the larger hedge. This trade is performed within the ANS,
20 with the trade being reported through the ANS server in a conventional manner. As for the residual component, the number of shares that need to be purchased or sold to satisfy the larger hedge is sent to market for execution at step 3065. That can be accomplished, for example, by a program in the ANS server which automatically fills a separate trade ticket in which the number of shares of the underlying security that are required to satisfy
25 the residual component are either purchased or sold.

EXAMPLE 6

With reference to Fig. 24-1A, Goldman takes the offer made by Reliant, but in this transaction modifies the hedge to propose a purchase of the same number of
30 shares of the issue PHI^A at a different hedge. The price (which in this example is \$48.9539) of the issue to be traded (here, PHI^A) relative to a versus (\$27.5) in the underlying instrument (PHI), and the number of that issue called for in the selected offer

are not modified by the aggressor, Goldman Sachs Group. However, Reliant had specified a first hedge of 92% in that order, and we assume in this example that Goldman changes that hedge to 100%. Nevertheless, upon confirming the trade using the confirm button 2450, both orders can be automatically executed through the trading system of the present invention.

Because Goldman is buying the same number of shares of the issue that Reliant is selling at an agreed upon price relative to the versus, this component of the trade can be executed automatically within the networked trading system 2800, 2900, and more preferably within the ANS server 2810, 2910.

Also, because the Reliant swap order has the smaller hedge, it is cross-traded with the Goldman order and is fully satisfied within the networked trading system 2800, 2900 such as at the ANS server 2810, 2910. That is to say, because Reliant needs to buy 116,000 shares of PHI (the underlying security) to satisfy its 92% hedge and Goldman needs to sell (or sell short) approximately 126,000 shares of PHI, Reliant can buy all of the shares of PHI that it needs directly from Goldman through the auspices of the trading system. (Remember, Reliant does not know that Goldman is taking the offer and Goldman does not know that Reliant made the offer.)

As for the residual component of Goldman's order, the 10,000 shares of PHI are sold outside of the ANS in a separate trade ticket made to purchase those shares at either the market price or a limit price. The separate trade ticket can be processed in a conventional manner by an electronic trading network such as SuperDOT. This trade of the residual component combined with the swap that is traded within the ANS with the subscriber Reliant will fully satisfy the Goldman order.

In use, the system 200 can collect fees from users in connection with the various functionalities that are provided. For example, users can be charged for opening up a book page, for using the price it function, and for using the advertise market function (e.g., for posting, showing the book for the advertised issue, or adding the advertised issue to his or her map page(s)). A customer can either be charged or credited for placing an order. As a departure from conventional billing schemes, the credit provides an incentive to a user to add liquidity to a given swap market. In addition, fees can be assessed for any trades through the system or routed to an executing agent by the system.

Further, additional fees can be charged for facilitating any negotiations required to consummate a trade, and for providing reports concerning issues and underlying instruments that are traded by that customer and for watch services which report the activity in particular issues.

5 A system in accordance with the invention is initially configured to accommodate all issues with which each user is concerned. Users of the system and method include hedge funds, mutual funds, pension funds, investment managers, bank trust departments, broker-dealers, and other businesses that engage in arbitrage or convertibles trading. Users can be anonymous, but in the preferred embodiment are
10 registered so that the activity for all held and watched instruments that they identify can be displayed by the system.

Users may spend the majority of their time on the map page 600 allowing for them to monitor their swap markets throughout the trading day. Users can view or quote markets of interest from this page and, if customers require detailed information
15 on a given market, a push of the button 604 activates a macro or other routine which instantly brings the user to the appropriate book page 500. The macro automatically sorts the order information by bid and offer so that the best (highest) bid and best (lowest) offer are arranged on the blue (current market) line. Bids are arranged in descending order below the current market bar 502 while offers are arranged in ascending order
20 above the bar. From the book page, customer information can be manipulated and, at any given time, the user may also utilize the split print or average price features by pressing either of these buttons.

At certain levels, positions will be traded. As mentioned earlier, in the case of convertible arbitrage, typically a convertible security will be traded against
25 common stock. If the bid for or offer price in the convertible security is not a factor of one sixteenth of a dollar, a split print can be performed by pressing the split print button and entering the position to be traded along with the exact price needed. The results are displayed below the entries.

Often times, customers will buy or sell securities at various prices and
30 need the average price of the trades. In convertible arbitrage, the average price of common stock may be required in order to determine where the convertible security should be traded. In this case, the user moves to the average price page by pressing the

average price button. The individual quantities of common stock traded are then entered along with their prices. Using the average price, the user can return to the map page and enter the average price into the common price field of the relevant market box 602. The price at which the convertible security should be traded is displayed. If the price is not
5 a factor of one sixteenth of a dollar, the above split print procedure is performed. The same is true for other trading intervals other than 1/16ths, such as pennies or penny-fractions.

As customers cancel orders, the bid and/or offer information is retained in the order log and marked cancelled by the system. At any time, the user may view
10 order activity by pressing the Order Log button 1541C. This allows the user to retain information about those customers who have an interest in a given swap market.

The system and method provides an efficient means of conducting arbitrage business (primarily convertible arbitrage) and increases the liquidity of the convertibles market while eliminating the significant element of human error that exists
15 in the manual process. The system allows for greater information flow and heightened data integrity, which enhance the users' competitive advantage while eliminating much of the errors that cost business, time, and money.

On the floor of the NYSE, in particular, convertible arbitrage is among the most lucrative and difficult of existing businesses to conduct. Few of these businesses
20 currently conduct convertible arbitrage. The present invention not only provides the existing businesses that are conducting convertible arbitrage with a strong competitive advantage, but can permit other businesses to engage in the business as well.

The invention can be combined with a hand held instrument (e.g. Palm Pilot) enabling the exchange floor brokers or other users to view real time information
25 at the point of execution.

The invention serves as an interface for all users to a network such as the ANS. Embodiments can be configured specifically for companies conducting convertibles trading and/or arbitrage business on the floor of stock exchanges. Preferably, the floor version is provided with touch-screen capability, and receives an
30 automatic feed of security prices from a Bloomberg or related informational and communication system. Coupled with such a system, swap markets and other information can be quoted to existing and prospective customers more efficiently.

Other embodiments can be configured for use "upstairs, that is, for use at hedge funds, broker-dealers, and all other entities engaging in convertibles trading and arbitrage outside of or off the floor of the exchange. The upstairs version can be coupled with existing, proprietary systems used by traders to manage positions or provide
5 financial services to their customers or for their own accounts.

The details of one embodiment of the invention can be applied with equal advantage to other embodiments within the spirit of the present invention.

The foregoing system and method can be implemented using a commercially available browser as the user interface. The browser preferably is Java,
10 JavaScript, DHTML or XML enabled, which includes a substantial majority of the browsers that are currently available. Those of skill in the art understand that the systems and methods of the present invention, when implemented in an object oriented language, need not follow the logical flow of the processes illustrated in the drawing Figures, but rather can be event-triggered; the flow diagrams are provided to illustrate in detail the
15 functionality of the features of the present invention, and are not provided by way of limitation of the invention, which is defined only by the claims appended hereto and equivalents thereof.

GLOSSARY

(Conv) = Conversion Ratio of the convertible instrument.

(CPx) = Common Stock Price.

(Par) = Parity.

5 (Prem) = Premium Points over Parity.

(Disc) = Discount Points from Parity.

(Conv) x (%Hedge) = Per Share Hedge (Per).

The price of a "convertible bid" or a "convertible offer" is determined by adding to parity (Par) any premium (Prem) or discount (Disc) points.

10 A "repriced convertible bid" and a "repriced convertible offer" are computed, respectively, to be $((\Delta CPx) \times (Per)) + (Conv \text{ Bid or Offer})$.

An "aggressor" is the party hitting a bid or taking an offer.

"Average price" refers to the average execution price for one or more trades.

15 "Best bid" is the bid having the highest price bid to purchase a particular tradeable instrument at a given price of for the underlying stock.

"Best offer" is the offer having the lowest price offered to sell a particular tradeable instrument at a given price of the underlying stock.

20 A "conversion ratio" is a quantity uniquely established for each convertible issue and has a readily ascertainable value from standard references such as Bloomberg Reporting Services.

A "customer" is the person for whom an order is placed. A customer can also be the person placing an order, and in that situation the customer is a "user", defined below.

25 A "dollar neutral" adjustment to an order multiplies the change in an underlying security by the conversion ratio for the issue in question by the move percentage specified by a customer and adds that quantity to the bid or offer price prior to the change in the underlying security to yield an adjusted, new bid or offer. A similar calculation can be made in terms of bids and offers expressed in points relative to parity.

30 An "execution" refers to a sale of a specific number of shares of a security in the public market.

An "execution price" is the price at which a trade is executed.

"Issue" refers to a financial instrument that is related to or equivalent to or exchangeable into a security which is being traded against. Examples of issues include convertible bonds, convertible preferred stocks, structured convertible securities, equity and index options, warrants, when-issued securities, and instruments arising from mergers.

A "liquidator" is the party entering an order into the market or providing liquidity to a market.

A "modified" order includes changes relative to an original order placed by a customer. Technically, a modified order is a cancellation of all or parts of the original order and/or a posting of a new order. The effect, however, is to change the original order to now recite the desired parameters.

"Name" is synonymous with issue.

An "option" is sometimes more generally referred to herein as a security.

The term "parity" with respect to a convertible issue is the computation of the price of the underlying common stock times the conversion ratio of the issue in question, in other words, $(Cpx) \times (Conv)$. With respect to a warrant or similar contract, parity is the underlying security price minus a strike price. $(Cpx) - (Strike)$.

A "revised" order is the same as a modified order.

"Split print" refers to an execution that is done in two parts, for example, to achieve a needed price when such price cannot be achieved in a single execution. The second print is at a higher interval (e.g., 1/16th higher) and is computed as $((Px \text{ Needed}) - (\text{Nearest Sixteenth Below})) \times (16) \times (\text{Total Size})$. The first print is then at the lower interval (e.g., 1/16th lower than the second print) and is computed as $((\text{Total Size}) - (\text{Second Print}))$.

print) and is computed as $((\text{Total Size}) - (\text{Second Print}))$.

A "swap order" is an order to trade financial instruments in which there are at least two components to the trade for substantially simultaneous execution. Typically, the two components include a purchase order and a sell order. For example, a swap order can consist of an order to buy an issue and sell short the underlying security or to sell short the issue and buy the underlying security. Such orders are conventionally expressed as, for example, "25,000 PHI^{PrA} @48.50 on a 100% hedge," which means that a customer wishes to set up 25,000 of PHI^{PrA} at a price of \$48.50 versus the current price

of the underlying security at a 100% hedge. In practice, swap orders originate with a customer who is interested in either setting up, covering, turning, or reversing a hedge.

A "swap" refers to the trading of a swap order between two or more customers. The trading of a swap order is conditioned upon finding a willing trader who
5 agrees to take the position of another customer/trader. That is, a swap is a compound trade of the components in the swap order. For example, a swap trade includes the purchase from another customer of a given number of a first instrument and the generally simultaneous sale of a number of a second, underlying instrument from the same customer. A swap also includes the reverse situation, namely, the sale of a first
10 instrument from a given customer and the simultaneous purchase of the underlying instrument from that same customer. Note that the "purchase" can be a put option, the "sale" can be a call option, and other instruments can be used to swap a given hedge consistent with the strategy being used.

A "trade" is synonymous with an execution.

15 A "user" is a convertibles trader or arbitrageur who uses the system for itself or on behalf of its customers to manage and optionally trade instruments pertaining to convertibles trading or arbitrage. The user uses the system on behalf of itself only if the user is also the customer.

"Versus" is a shorthand term to refer to the price of the underlying
20 security. The versus can be specified by a user or customer, and it can be set to be the last plus-tick sale before the close of a trading day.

"Underlying security" is a common stock or other tradable instrument for which there exists a market.

I Claim:

- 1 1. In a computer implemented system, a method for identifying a current swap
2 market in one or more tradable instruments, comprising the steps of:
3 a) receiving plural bids and offers for at least one tradeable instrument, each
4 bid and offer including move percent data which relates new values for
5 the bids and the offers to changes in price in an underlying instrument;
6 b) periodically updating the bids and offers using the move percent data in
7 response to changes in price in the underlying instrument;
8 c) providing an electronic display of at least a best bid, having the highest
9 price bid for the at least one tradeable instrument, and a best offer, having
10 the lowest price offered to sell the at least one tradeable instrument,
11 wherein the best bid and best offer are correlated with a particular price
12 of a predetermined underlying instrument.
- 1 2. The method as in claim 1, wherein the bids and offers are received from
2 remote stations through an electronic communication link.
- 1 3. The method as in claim 2, wherein the electronic display provided by the
2 system is transmitted to the remote stations through the electronic
3 communication link.
- 1 4. The method as in claim 1 wherein the bids and offers are periodically and
2 automatically updated.
- 1 5. The method as in claim 1, wherein the electronic display further includes
2 a display of the size of at least the best bid and offer at the particular
3 price.
- 1 6. The method as in claim 4, wherein the particular price is the current price
2 in the underlying instrument.

- 1 7. The method as in claim 1, wherein the best bid and the best offer are
2 expressed in points relative to parity.
- 1 8. The method as in claim 1, wherein the best bid and the best offer are
2 expressed in dollars.
- 1 9. The method as in claim 1, including the additional step of providing a
2 display of sorted bids and offers on the electronic display.
- 1 10. The method as in claim 1, wherein the electronic display includes the best
2 bid and offer for a plurality of tradeable instruments, each correlated with
3 a particular price of a respective underlying instrument.
- 1 11. The method as in claim 1, including the additional step of providing a
2 summary of the best bid and offer for each of a plurality of tradeable
3 instruments along with a respective last sale plus-tick price in an
4 underlying instrument correlated therewith.
- 1 12. The method as in claim 10, wherein the summary is provided
2 electronically to the remote stations.
- 1 13. The method as in claim 11, wherein the summary is provided by
2 electronic transmission from the system.
- 1 14. The method as in claim 10, wherein the best bid and best offer are
2 expressed in dollars and in points relative to parity.
- 1 15. In an automated system, a method for identifying on a display of a
2 computer a current swap market consisting of a best bid order and a best
3 offer order among plural pending orders to trade a particular instrument,
4 each pending order including a price for the instrument priced relative to

- 1 a versus for an underlying security and a specified move percentage,
2 comprising the steps of:
- 3 a) providing a current price quote on the underlying security to the
4 computer;
5 b) calculating a difference value between the versus and the current price
6 quote for each of the pending orders;
7 c) automatically modifying each of the pending orders to effect dollar
8 neutraling; and
9 d) displaying at least a portion of the modified orders.

1 16. The method as in claim 15, wherein dollar neutraling is effected by multiplying
2 the difference value times the specified move percentage times a conversion ratio
3 for the particular instrument.

1 17. The method as in claim 15, wherein the step of providing a current price quote to
2 the computer comprises providing a real-time data feed to the computer.

1 18. The method as in claim 15, including the additional step of sorting the modified
2 orders.

1 19. The method as in claim 18, wherein the displaying step only displays the best bid
2 order and the best offer order.

1 20. The method as in claim 15, including the additional step of repeating steps (a)
2 through (d) at a prescribed interval.

1 21. The method as in claim 15, including the additional step of repeating steps (b)
2 through (d) in response to being provided with a further current price quote.

1 22. A method for swapping a financially tradeable instrument, comprising the steps
2 of:

- 1 a) providing a plurality of swap orders for display at a station connected to
- 2 a distributed computer network, each swap order specifying a price for the
- 3 instrument, a number of the instrument to be traded, and a hedge;
- 4 b) obtaining at a central server a selection of a particular swap order from
- 5 the station;
- 6 c) obtaining at the central server terms from the station for executing the
- 7 trade;
- 8 d) comparing the terms for executing the trade to the price, number and
- 9 hedge specified in the particular swap order; and
- 10 e) handling the swap order by automatically executing the swap order in the
- 11 event that the terms match.

1 23. The method as in claim 22, wherein the step of handling the trade includes
2 trading the specified number of the instrument at the specified price and trading
3 a number of an underlying instrument in accordance with the hedge at a current
4 market price for said underlying instrument.

1 24. The method as in claim 22, wherein the step of handling the trade includes, in the
2 absence of matching terms:
3 (1) establishing an anonymous and electronic negotiation session between the
4 station that posted the particular swap order and the station from which
5 the terms for executing the trade were obtained; and
6 (2) automatically executing the trade if, as a result of the negotiation session,
7 the terms match.

1 25. The method as in claim 24, wherein the negotiation session occurs within a
2 prescribed period of time.

1 26. The method as in claim 22, wherein the step of handling the trade includes the
2 step of routing matching swap orders to an executing agent for execution.

- 1 27. The method as in claim 22, wherein the comparing step occurs at the central
2 server.
- 1 28. The method as in claim 22, including the additional step of accessing a fee
2 schedule associated with the station and charging for the trade in accordance with
3 the fee schedule.
- 1 29. The method as in claim 22, wherein the terms for executing the trade obtained at
2 the station are supplied to that station as default values in response to the
3 selection of the particular swap order.
- 1 30. The method as in claim 29, wherein the default values are automatically included
2 in a trade ticket form in response to the selection of the particular swap order.
- 1 31. The method as in claim 22, wherein the hedge for executing the trade obtained
2 at the station is supplied in accordance with any trading preferences associated
3 with that station.
- 1 32. The method as in claim 31, wherein the hedge is selected using the trading
2 preferences in view of a current market price for an underlying instrument.
- 1 33. The method as in claim 22, wherein the swap order has components including the
2 instrument and an underlying instrument and wherein the components are traded
3 simultaneously.
- 1 34. The method as in claim 22, wherein the hedge is specified as one of a percentage
2 of the number of the instrument to be traded and a multiple of the number of the
3 instrument to be traded.

- 1 35. The method as in claim 34, wherein the multiple of the number is a fractional
2 multiplier.
- 1 36. The method as in claim 22, wherein the financially tradeable instrument is a
2 convertible hedge.
- 1 37. A method for swapping a convertible hedge, comprising the steps of:
2 a) providing a plurality of swap orders for display at a station connected to
3 a distributed computer network, each swap order specifying a price for the
4 convertible instrument, a number of the convertible instrument to be
5 traded, and a hedge;
6 b) obtaining at a central server a selection of a particular swap order from
7 the station;
8 c) obtaining at the central server terms from the station for executing the
9 trade;
10 d) comparing the terms for executing the trade to the price, number and
11 hedge specified in the particular swap order; and
12 e) handling the swap order by automatically executing the swap order in the
13 event that the terms match.
- 1 38. A method for swapping a financially tradeable instrument, comprising the steps
2 of:
3 a) displaying at a station connected to a distributed computer network a
4 plurality of swap orders, each swap order specifying a price for the
5 instrument, a number of the instrument to be traded, and a hedge;
6 b) selecting a particular swap order at the station;
7 c) confirming that the terms of the selected swap order are acceptable; and
8 d) forwarding the swap order for automatic execution.
- 1 39. The method as in claim 38, including the additional step of including the
2 specified price, number and hedge from the selected swap order on both the buy
3 and sell sides of a trade ticket as default values.

- 1 40. The method as in claim 39, wherein the default values are automatically included
2 in the trade ticket form in response to the selection of the particular swap order.
- 1 41. The method as in claim 38, wherein the step of forwarding the swap order
2 includes trading the specified number of the instrument at the specified price and
3 trading a number of an underlying security in accordance with the hedge at a
4 current market price for said underlying security.
- 1 42. The method as in claim 38, including the additional step of accessing a fee
2 schedule associated with the station and charging for the trade in accordance with
3 the fee schedule.

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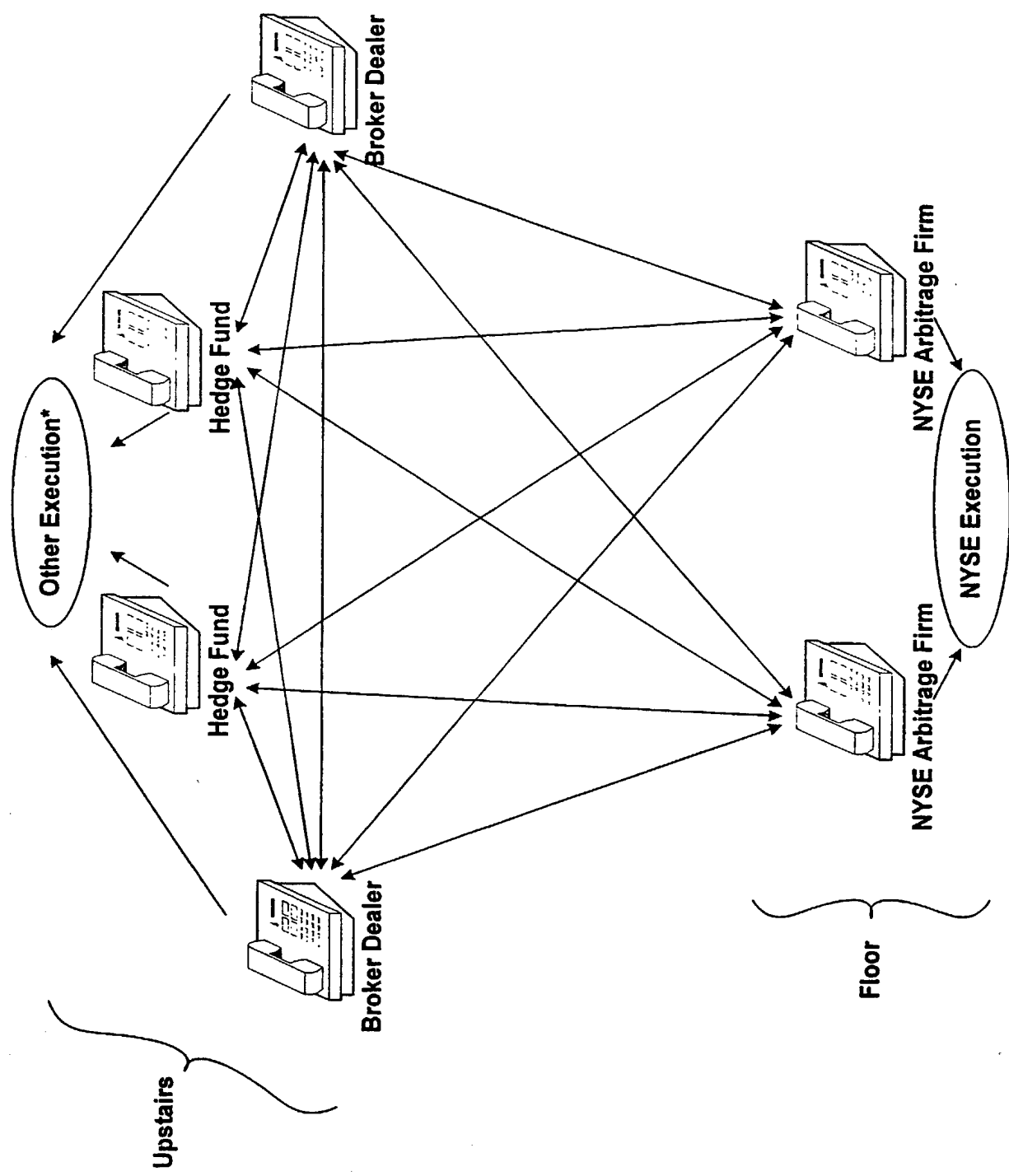


Figure 1

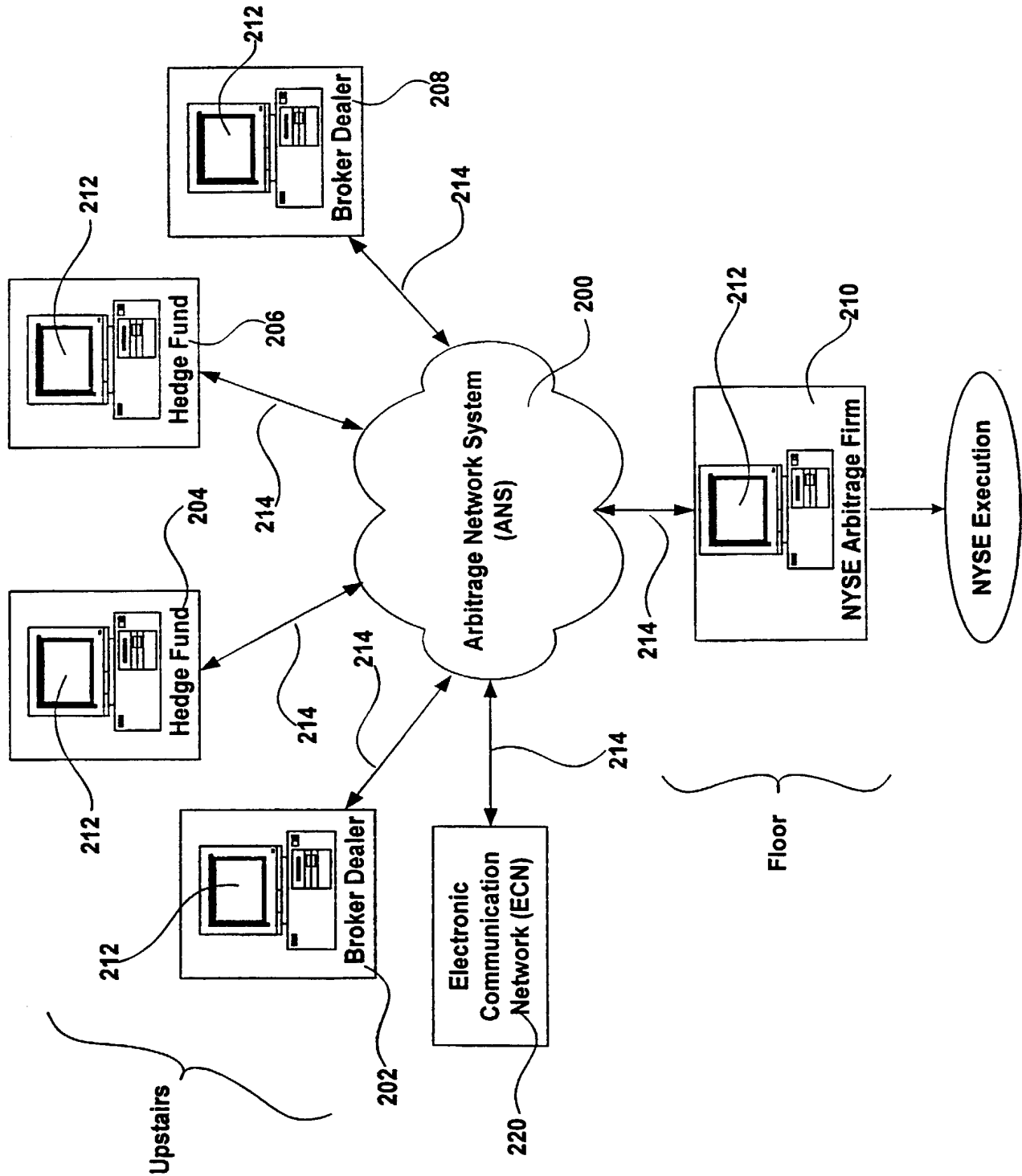


Figure 2

10/03/1996

301	308	310	312	314	316a	316b	318	320	322	324
PHI ^A	Customer	Hedge(%)	Move(%)	Versus	Bid (\$ Px)	Bid (Pts)	Issue Size	Comm Size	Memo	Curr Bid
	G	100.0%	100.0%	27 8/16		0.7500	25,000	42,800		47.8575
	M	83.0%	90.0%	27 2/16		0.7500	10,000	14,200		47.7933
	SB	87.0%	82.0%	27 8/16	47.6875		25,000	37,300	Subject	47.6875
	LB	95.0%	95.0%	27 6/16	47.3750		51,700	84,100	Long	47.5784
BUY SIDE										
27.5000										
PHI ^A	Customer	Hedge(%)	Move(%)	Versus	Offer (\$ Px)	Offer (Pts)	Issue Size	Comm Size	Memo	Curr Offer
	RELIANT	92.0%	85.0%	27 14/16		1.75	73,600	116,000		48.9539
	OP	75.0%	75.0%	27 8/16		1.875	22,000	28,300		48.9825
	BS	100.0%	100.0%	27 8/16	49.3750		21,000	36,000	Work	49.3750
	FORUM	86.0%	100.0%	27 3/16	49.0625		15,000	22,100	Short	49.5978
SELL SIDE										
27 8/16										
Current Common Price										
330A										
330										

Figure 3

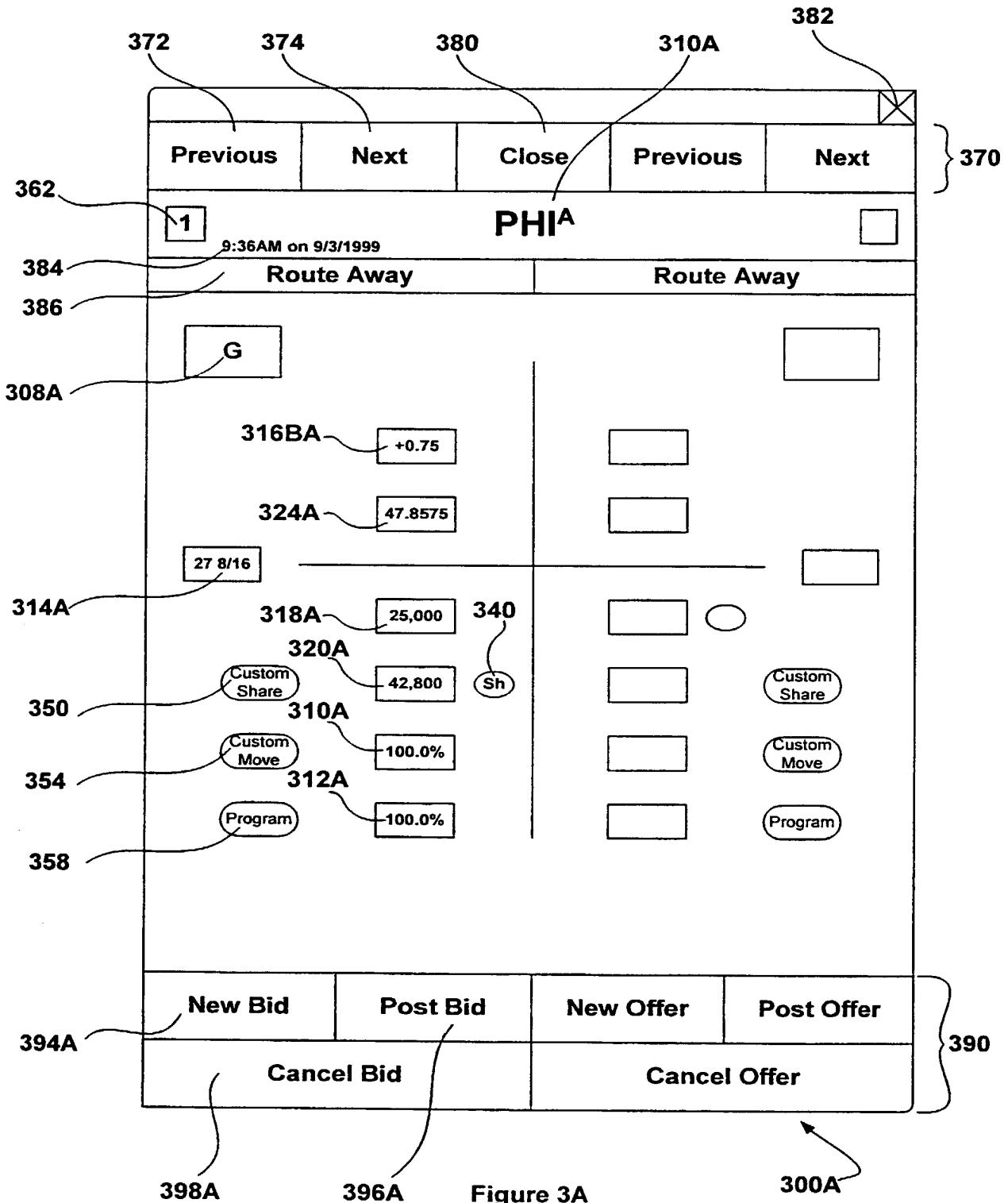


Figure 3A

310B 380 376 378 382

Previous Next Close Previous Next } 370

PHIA 1 9:48AM on 9/3/1999

Route Away Route Away

Rel

+1.75 316BB

48.9539 324B

73,600 318B

116,000 320B

92.0% 310B

85.0% 312B

27 8/16

Custom Share Custom Move Program

New Bid Post Bid New Offer Post Offer

Cancel Bid Cancel Offer

300B 394B 398B 396B

Figure 3B

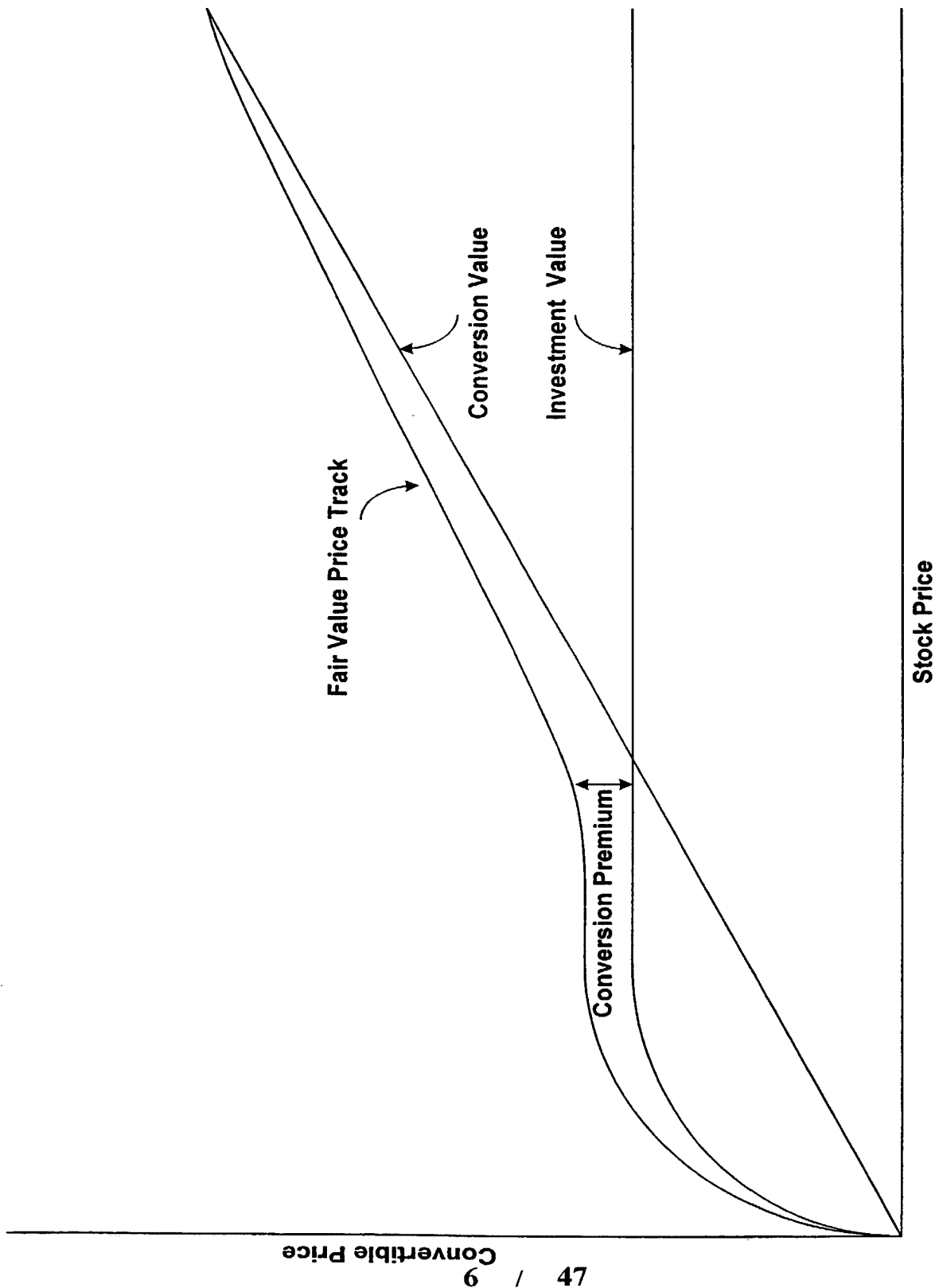


Figure 4

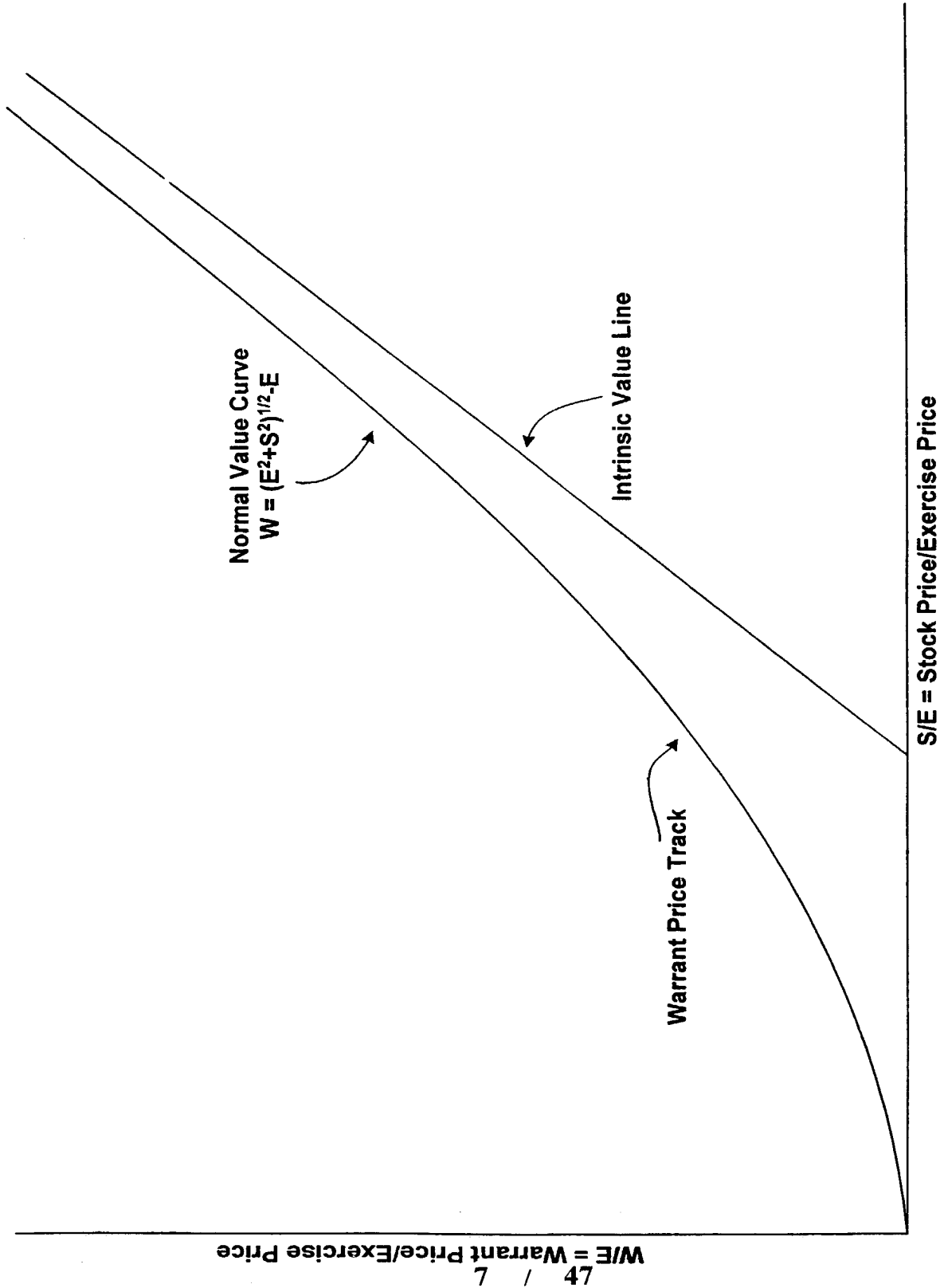


Figure 4A

10/031996

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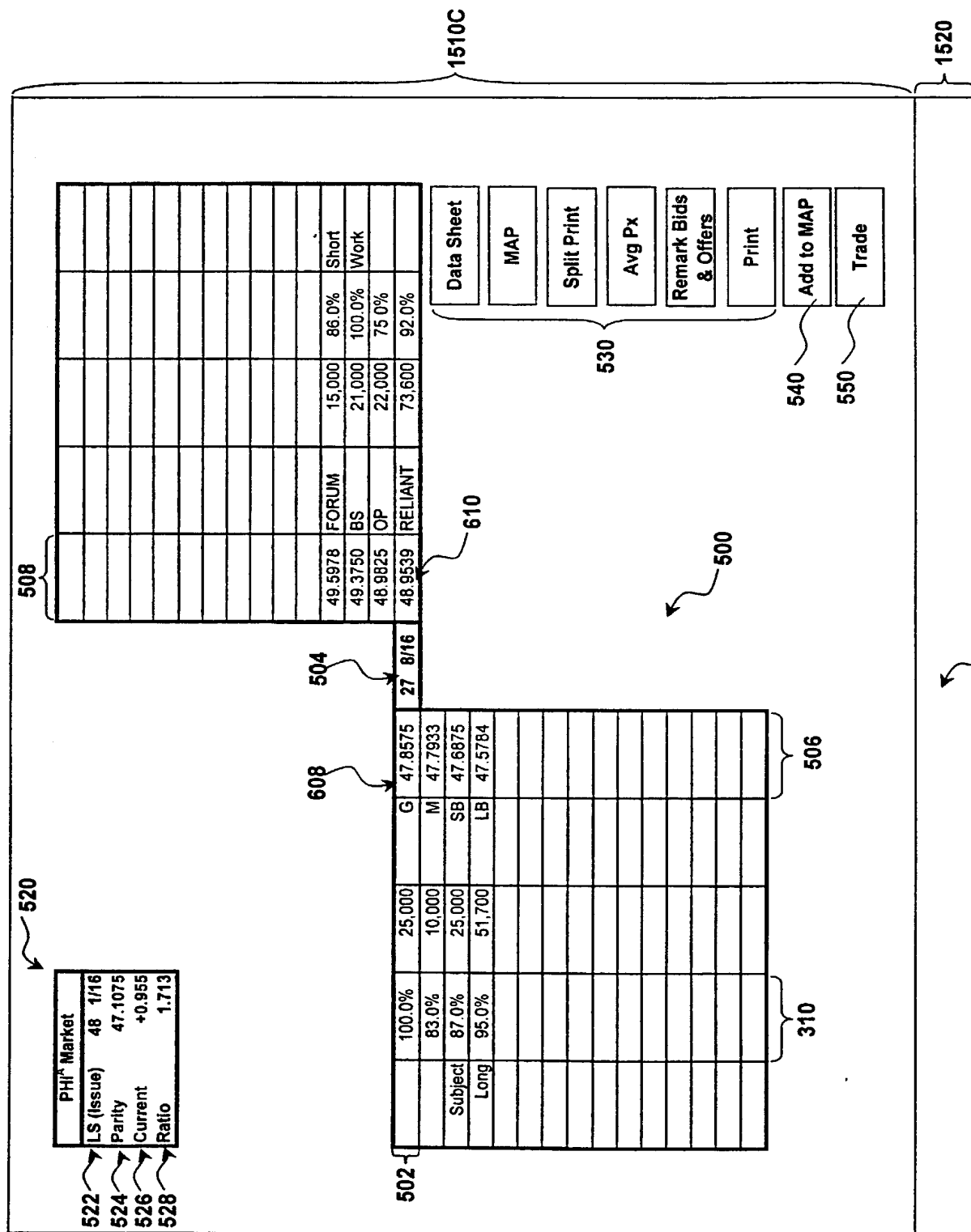


Figure 5

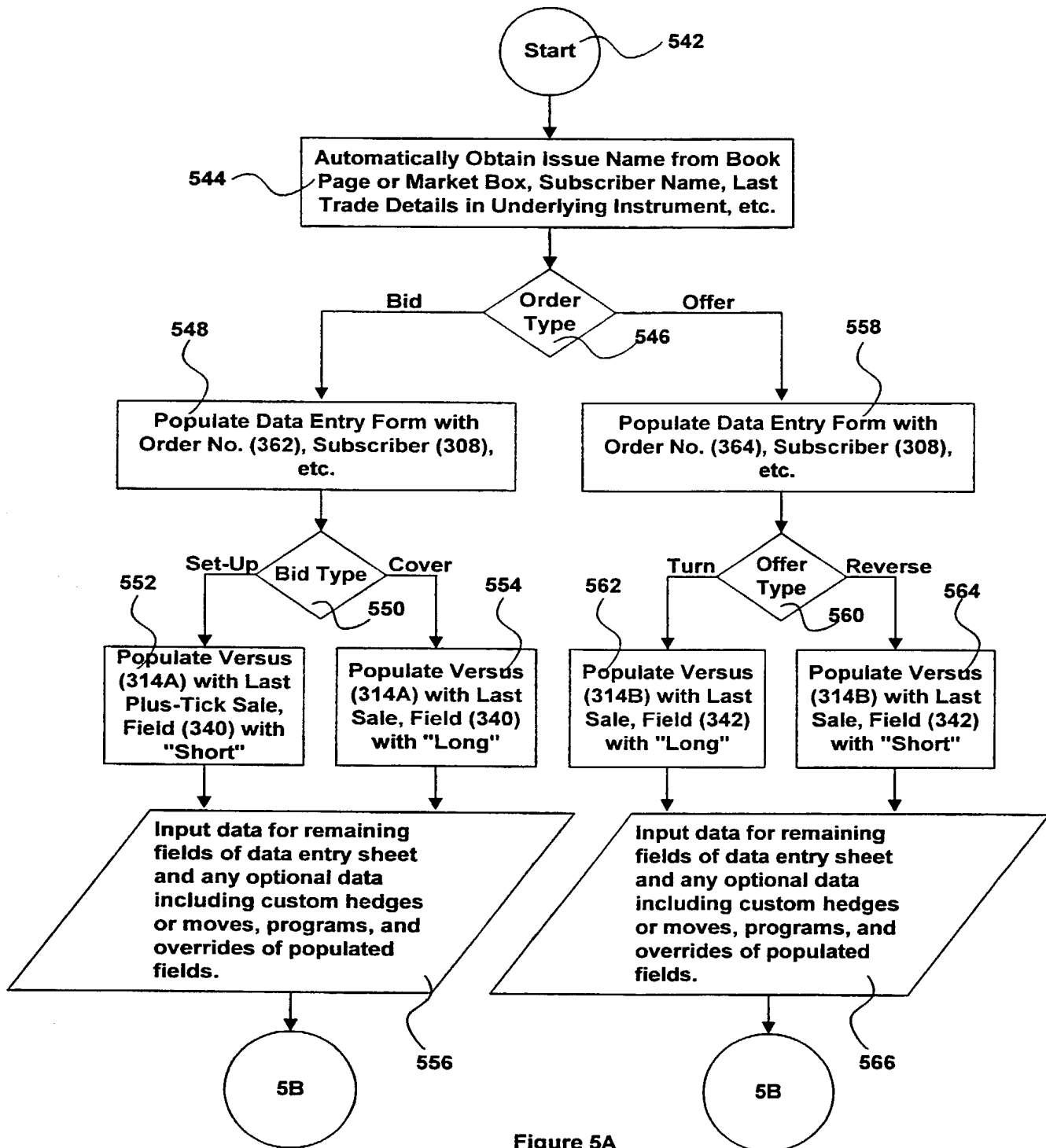


Figure 5A

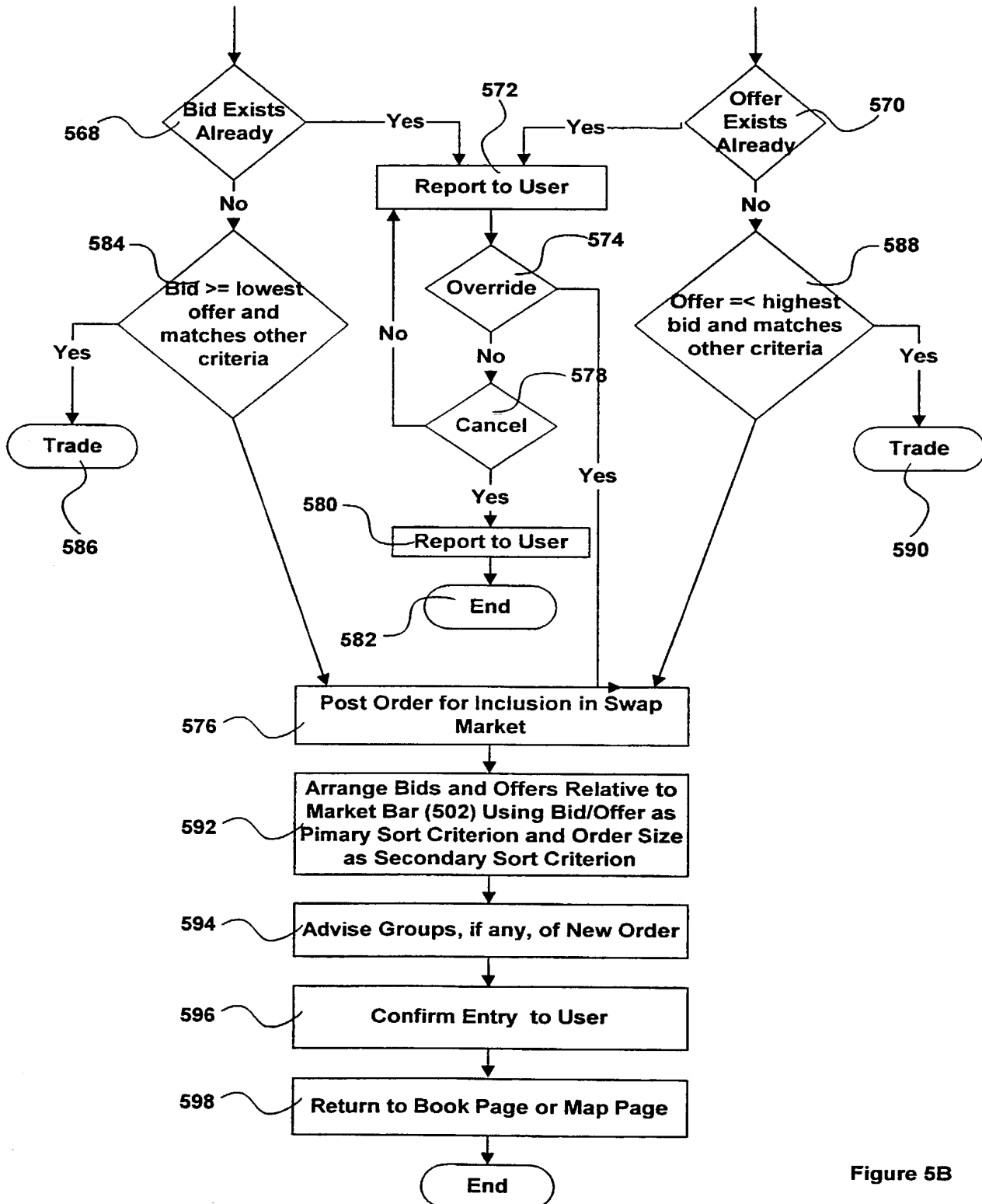


Figure 5B





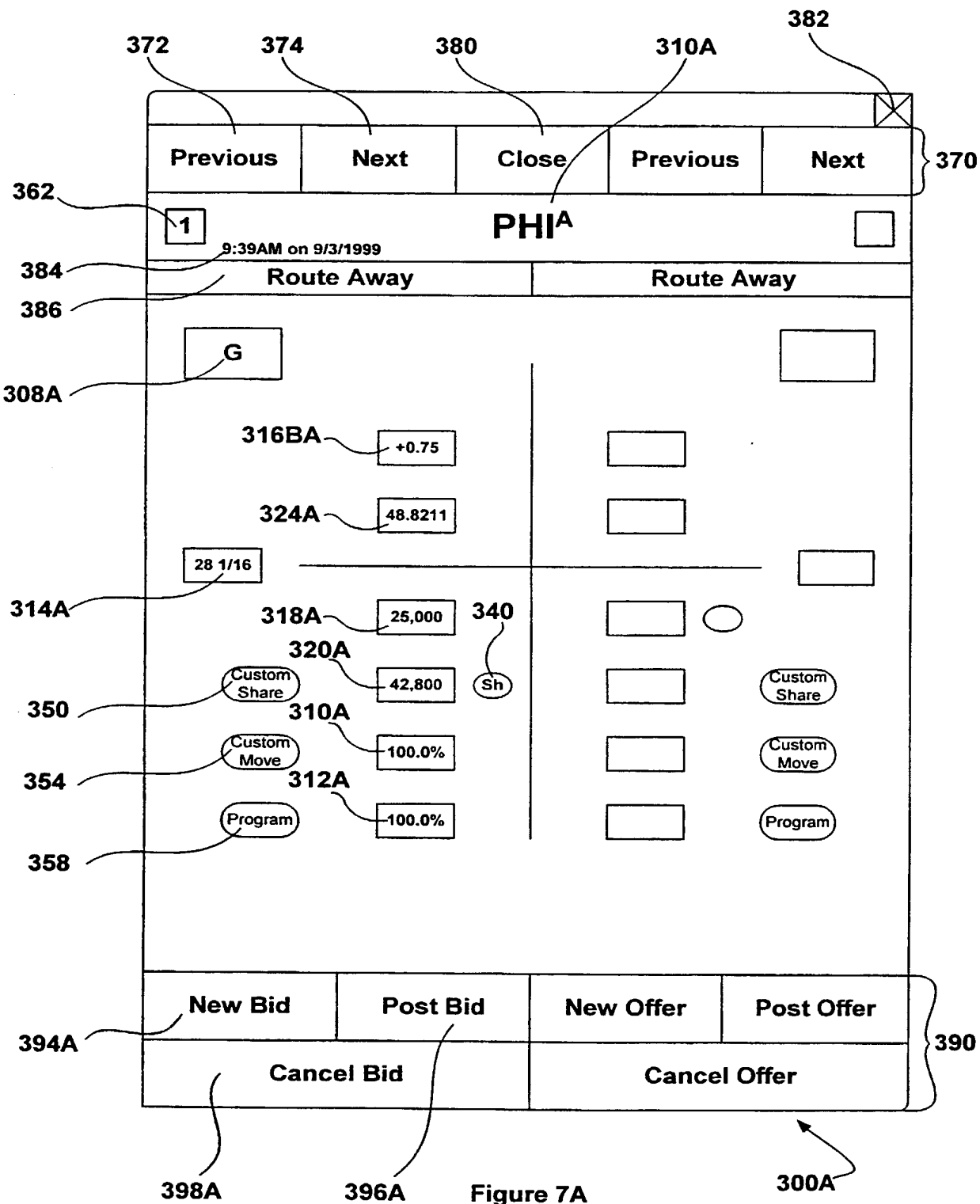


Figure 7A

✕				
Previous	Next	Close	Previous	Next
1	PHIA			1
10:20AM on 9/3/1999		9:56AM on 9/3/1999		
Route Away		Route Away		
<div style="border: 1px dashed black; padding: 5px;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">G</div> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;">+1.6341</div> <div style="border: 1px solid black; padding: 2px;">49.7052</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px;">28 1/16</div> <div style="border: 1px solid black; padding: 2px;">22,000</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px; border-radius: 10px;">Custom Share</div> <div style="border: 1px solid black; padding: 2px;">28,300</div> <div style="border: 1px solid black; padding: 2px; border-radius: 50%;">Sh</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px; border-radius: 10px;">Custom Move</div> <div style="border: 1px solid black; padding: 2px;">75.0%</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px; border-radius: 10px;">Program</div> <div style="border: 1px solid black; padding: 2px;">75.0%</div> </div> </div>		<div style="border: 1px dashed black; padding: 5px;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">Op</div> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;">+1.6341</div> <div style="border: 1px solid black; padding: 2px;">49.7052</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px;">28 1/16</div> <div style="border: 1px solid black; padding: 2px;">22,000</div> <div style="border: 1px solid black; padding: 2px; border-radius: 50%;">L</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px; border-radius: 10px;">Custom Share</div> <div style="border: 1px solid black; padding: 2px;">28,300</div> <div style="border: 1px solid black; padding: 2px; border-radius: 10px;">Custom Move</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 2px; border-radius: 10px;">Program</div> <div style="border: 1px solid black; padding: 2px;">75.0%</div> </div> </div>		
712		710		
714		716		
Confirm		Cancel		

Figure 7B

✕				
Previous	Next	Close	Previous	Next
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">1</div> <div style="border: 1px dashed black; padding: 2px 10px;">PHIA</div> <div style="border: 1px solid black; padding: 2px 5px;">VAR</div> </div> <div style="display: flex; justify-content: space-between; font-size: small; margin-top: 5px;"> 10:30AM on 9/3/1999 VAR on 9/3/1999 </div>				
Route Away		Route Away		
<div style="border: 1px dashed black; padding: 5px; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">G</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"></div> <div style="width: 60%;"> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">+1.6862</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">49.7573</div> </div> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> <div style="width: 40%; text-align: center;">28 1/16</div> <div style="width: 60%;"></div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">95,600</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">144,300</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">88.12%</div> <div style="border: 1px solid black; padding: 2px 10px;">82.70%</div> </div> <div style="width: 60%;"> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px; text-align: center;">Sh</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px; text-align: center;">Custom Share</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px; text-align: center;">Custom Move</div> <div style="border: 1px solid black; padding: 2px 10px; text-align: center;">Program</div> </div> </div> </div>		<div style="border: 1px dashed black; padding: 5px; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">VAR</div> <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"></div> <div style="width: 60%;"> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">+1.6862</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">49.7573</div> </div> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 10px;"> <div style="width: 40%; text-align: center;">28 1/16</div> <div style="width: 60%;"></div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">95,600</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">144,300</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px;">88.12%</div> <div style="border: 1px solid black; padding: 2px 10px;">82.70%</div> </div> <div style="width: 60%;"> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px; text-align: center;">L</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px; text-align: center;">Custom Share</div> <div style="border: 1px solid black; padding: 2px 10px; margin-bottom: 5px; text-align: center;">Custom Move</div> <div style="border: 1px solid black; padding: 2px 10px; text-align: center;">Program</div> </div> </div> </div>		
712		710		
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Confirm</div>		<div style="border: 1px solid black; padding: 5px; display: inline-block;">Cancel</div>		

Figure 7C

10/03/1996

Average Price #1		27.5470
Total Shares		28,300
# of Trades		930 8
Clear	Prev /	New /
Share Amount		Price
10,600		27 8/16
2,800		27 9/16
6,300		27 10/16
100		27 9/16
2,500		27 10/16
1,100		27 9/16
4,600		27 8/16
300		27 7/16
900		

Figure 9

Split Print #		Total Size	Price Needed
1		22,000	49.7052
Prev/New/Next	820	Size	Price
First Print	830	15,800	49 11/16
Second Print		6,200	49 12/16
Actual Print Price Achieved		49.7051	

Figure 8

Split Print #		Total Size	Price Needed
1		25,000	49.0223
Prev New Next		Size	Price
First Print		16,100	49
Second Print		8,900	49 1/16
1100			
Actual Print Price Achieved		49.0223	

Figure 11

47.9380	27.5470	49.0223
+0.75	Points	+1.8343

Figure 10

10/031996

PHIA		Current Common Price										Curr Bid
		Customer	Hedge(%)	Move(%)	Versus	Bid (\$ Px)	Bid (Pts)	Issue Size	Comm Size	Memo		
BUY SIDE		G	100.0%	100.0%	28 1/16		+0.75	25,000	42,800		48.8211	
		M	83.0%	90.0%	28 1/16		+0.5894	10,000	14,200		48.6605	
		LB	95.0%	95.0%	28 1/16	48.4938		51,700	84,100	Long	48.4938	
		SB	87.0%	82.0%	28 1/16	48.4776		25,000	37,300	Subject	48.4776	
PHIA		Current Common Price										Curr Offer
		Customer	Hedge(%)	Move(%)	Versus	Offer (\$ Px)	Offer (Pts)	Issue Size	Comm Size	Memo		
SELL SIDE		OP	75.0%	75.0%	28 1/16		+1.6341	22,000	28,300		48.9539	
		RELIANT	92.0%	85.0%	28 1/16		+1.7018	73,600	116,000		48.9825	
		BS	100.0%	100.0%	28 1/16	50.3386		21,000	36,000	Work	49.3750	
		FORUM	86.0%	100.0%	28 1/16	50.5614		15,000	22,100	Short	49.5978	

Figure 12

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ABC SECURITIES, INC.

Contact #

Statement or Disclosure

MAP

MAIN

ISSUE	LS+TICK		Dollar Px		Points	
	Common Px		Bid	Offer	Bid	Offer
PHI ^A	28	1/16	48.8211	49.7052	+0.75	+1.6341
Conv2	0		X	X	X	X
Conv3	0		X	X	X	X
Conv4	0		X	X	X	X
Conv5	0		X	X	X	X
Conv6	0		X	X	X	X
Conv7	0		X	X	X	X
Conv8	0		X	X	X	X
Conv9	0		X	X	X	X
Conv10	0		X	X	X	X
Conv11	0		X	X	X	X
Conv12	0		X	X	X	X
Conv13	0		X	X	X	X
Conv14	0		X	X	X	X
Conv15	0		X	X	X	X
Conv16	0		X	X	X	X
Conv17	0		X	X	X	X
Conv18	0		X	X	X	X
Conv19	0		X	X	X	X
Conv20	0		X	X	X	X
Conv21	0		X	X	X	X
Conv22	0		X	X	X	X
Conv23	0		X	X	X	X
Conv24	0		X	X	X	X
WS1	0		X	X	X	X
WS2	0		X	X	X	X
WS3	0		X	X	X	X

1300

Contact #

PLEASE CALL TO VERIFY LEVELS

Figure 13

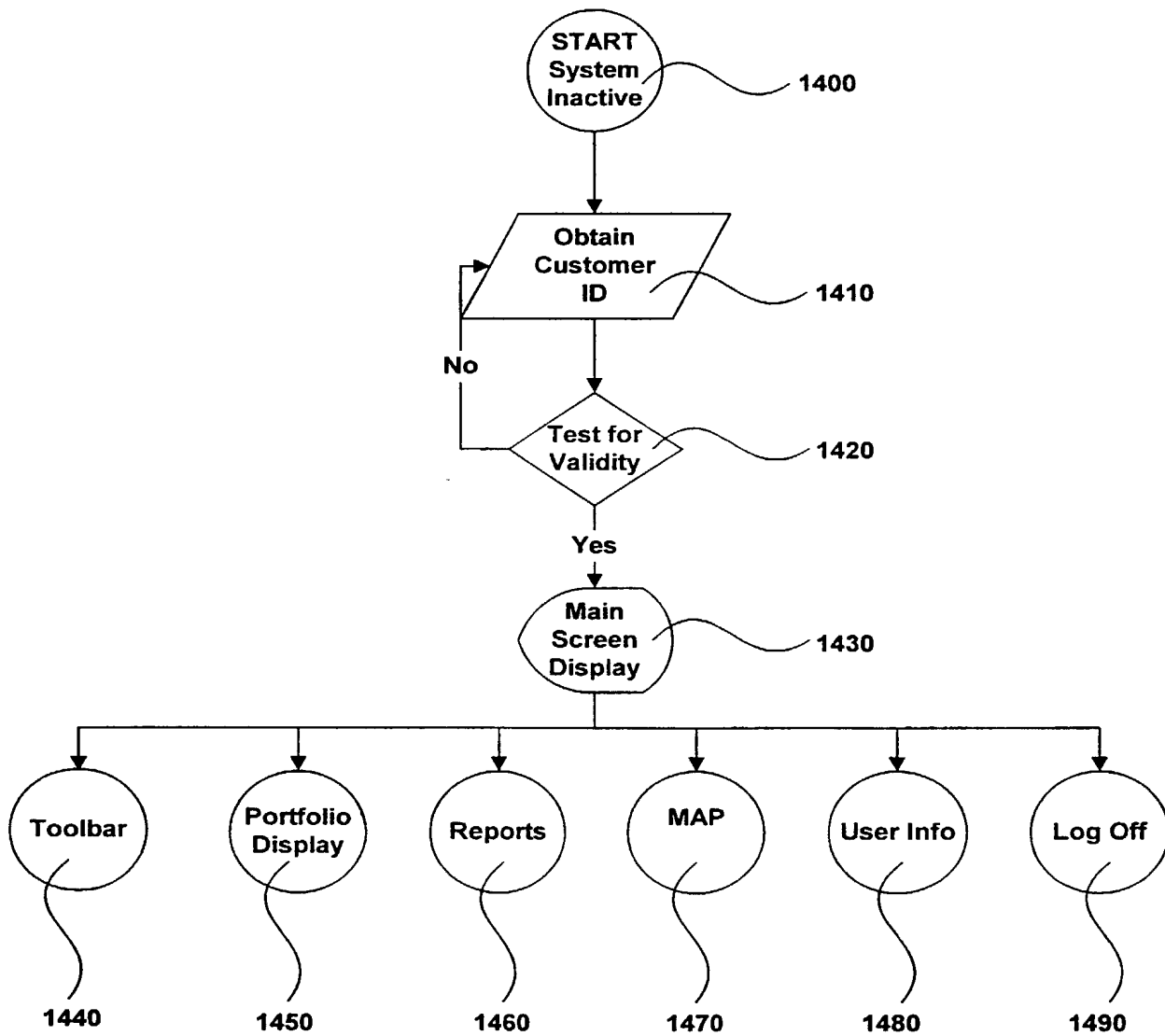


Figure 14

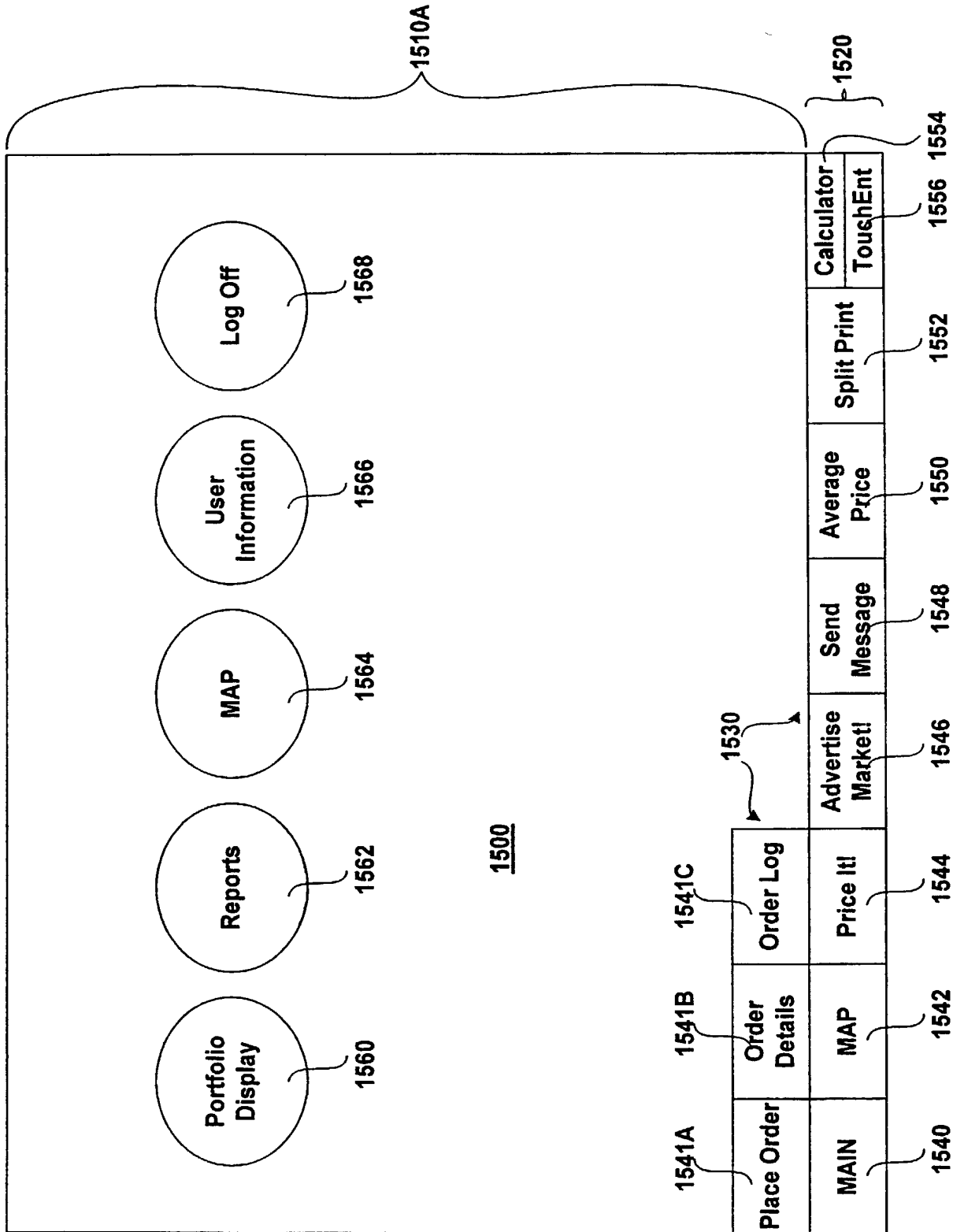


Figure 15

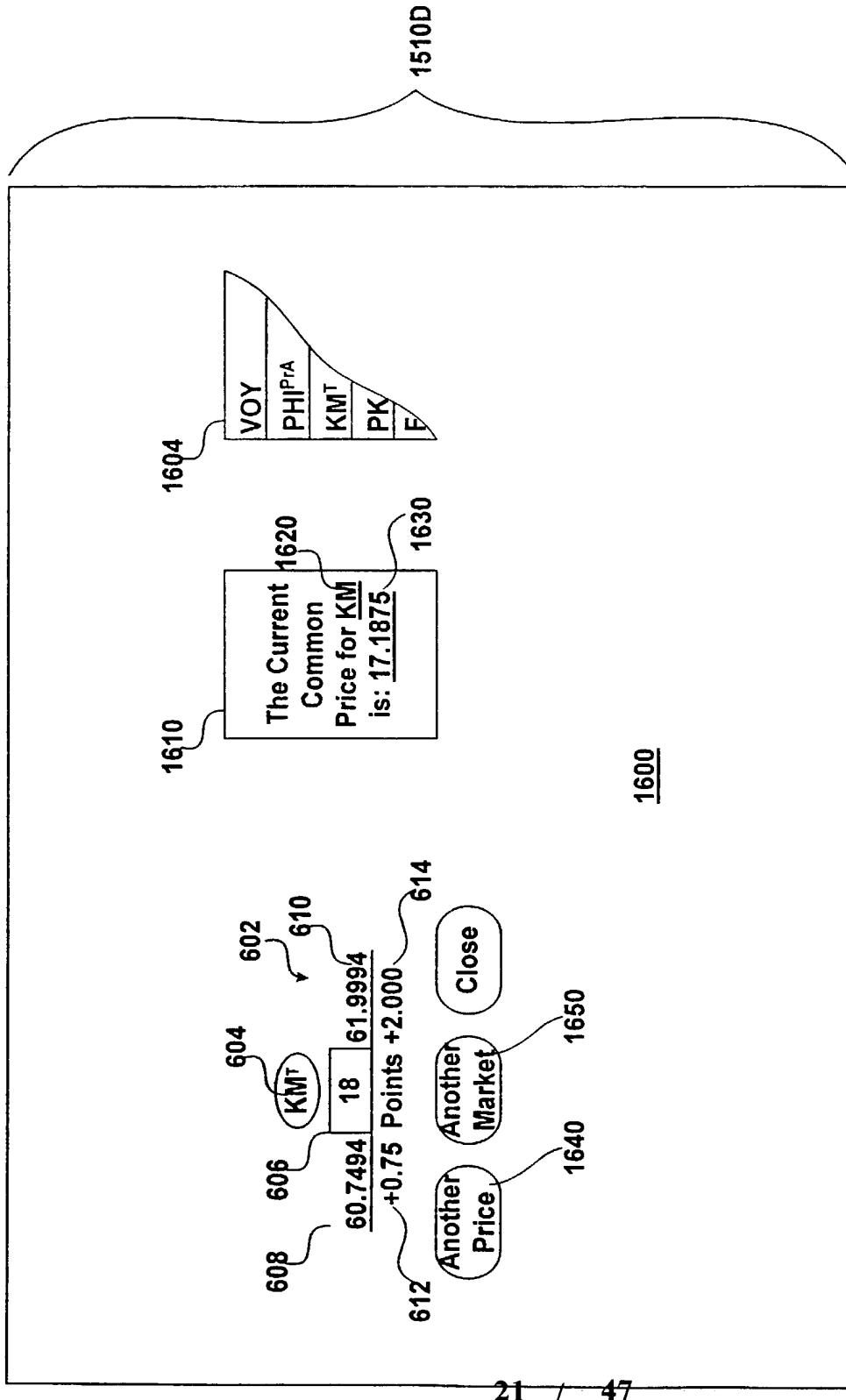


Figure 16

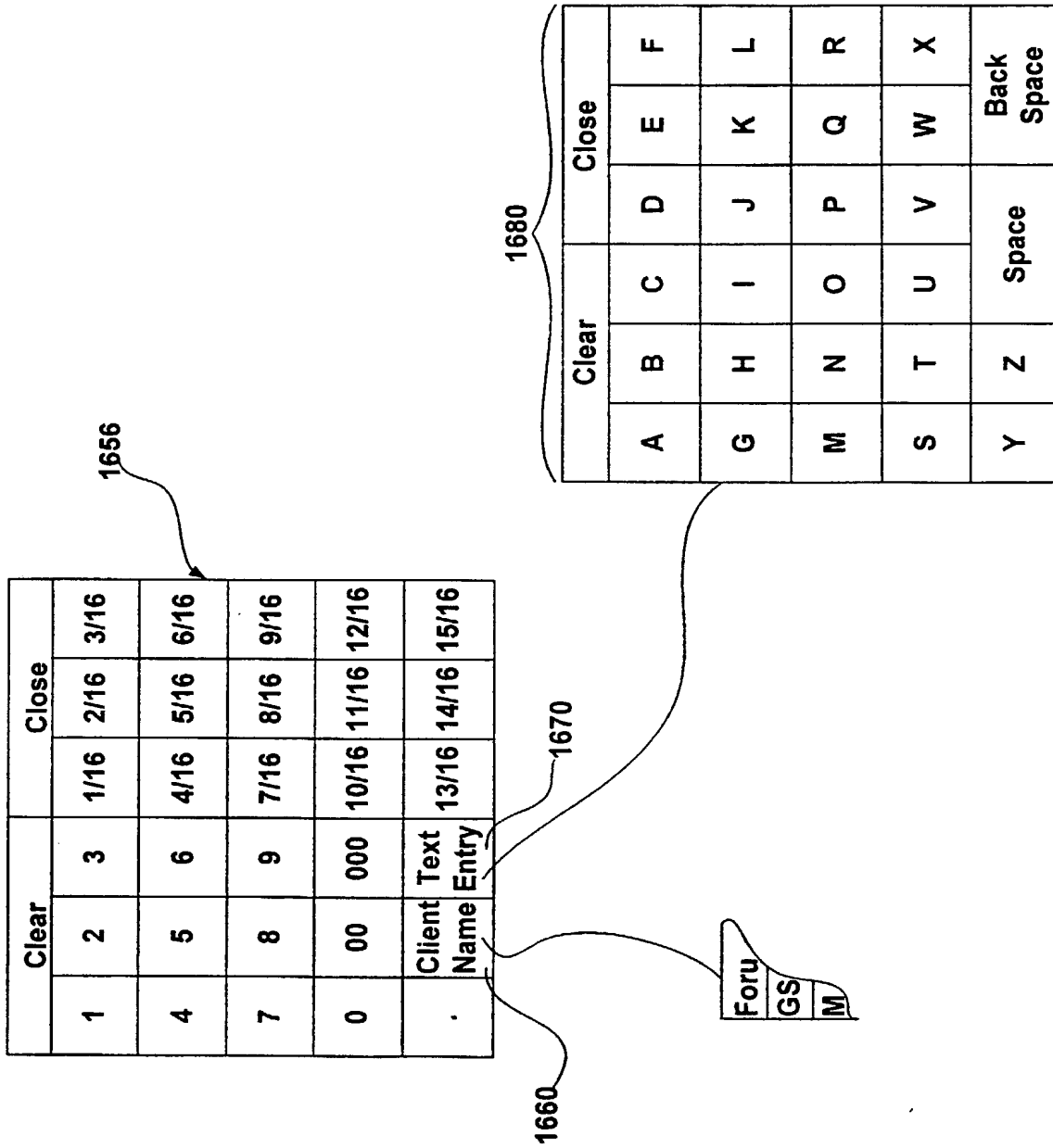


Figure 16A

10/03/1996

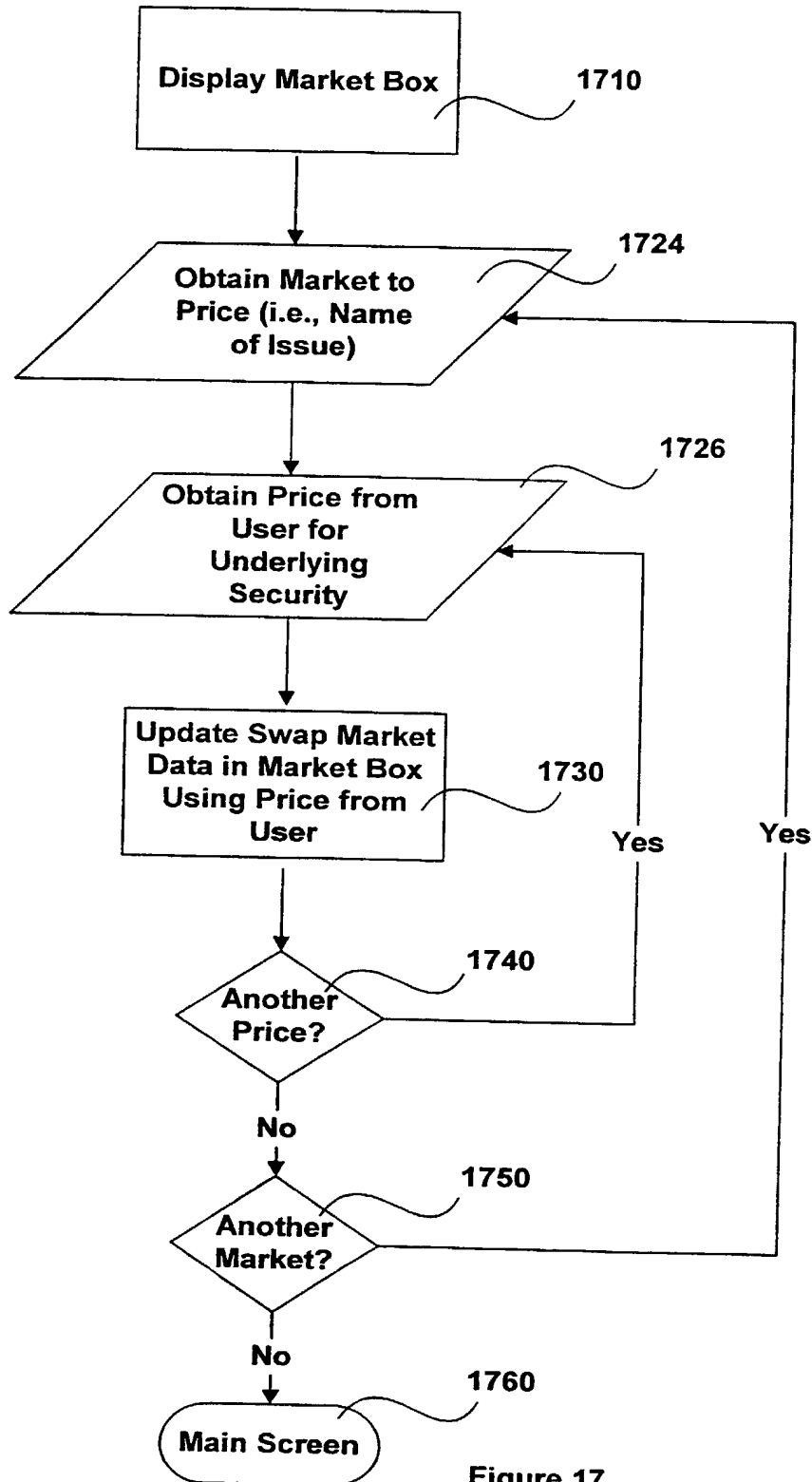


Figure 17

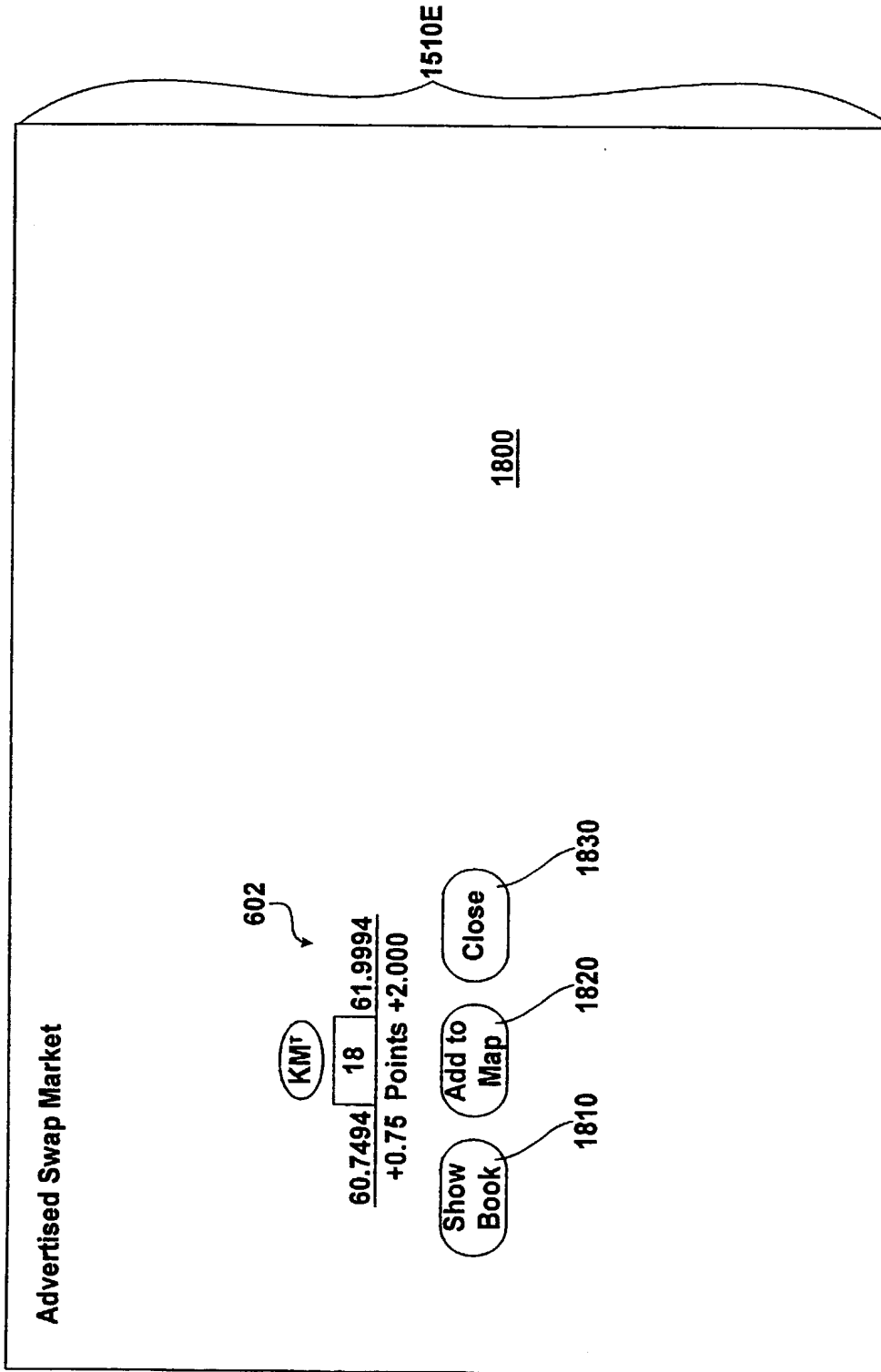


Figure 18

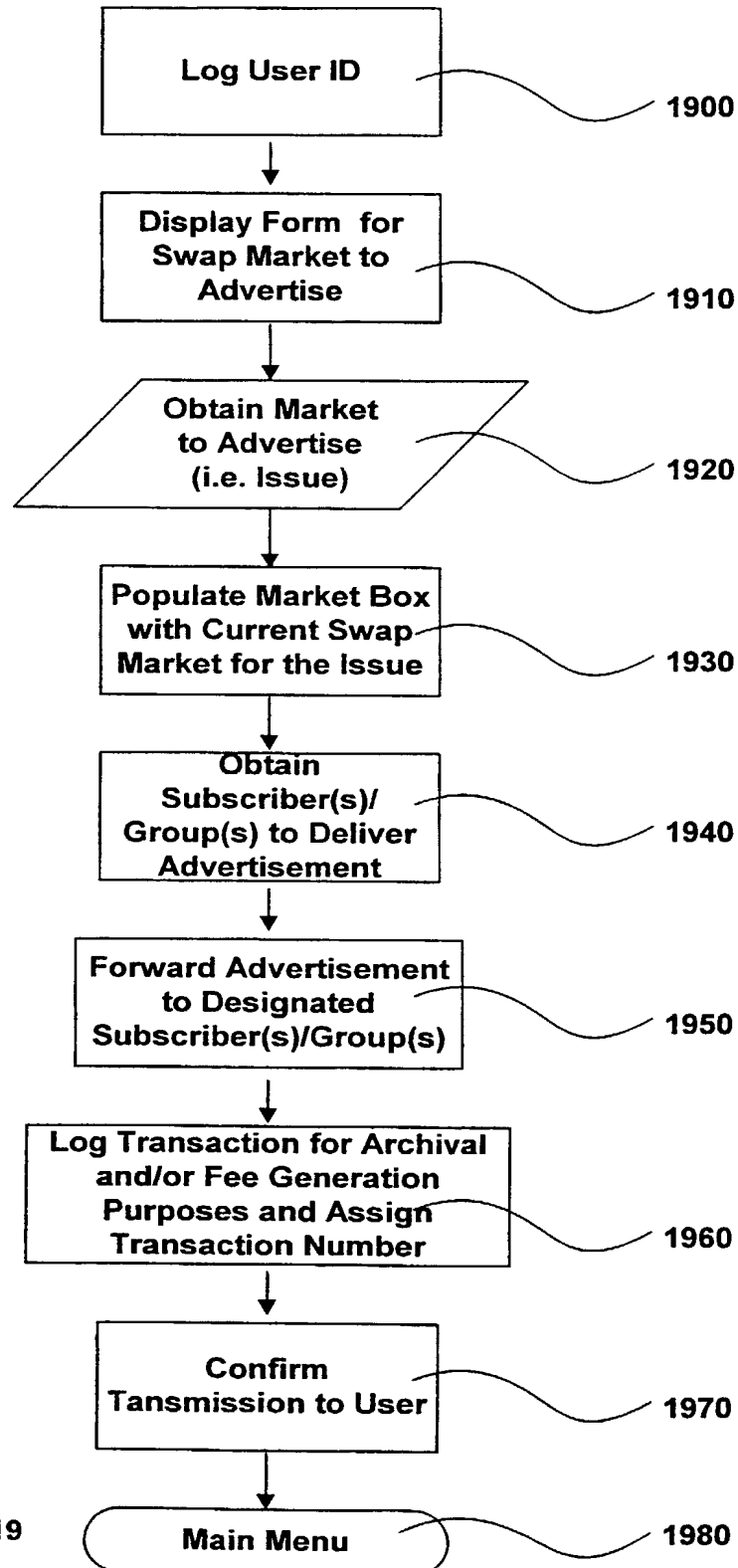


Figure 19

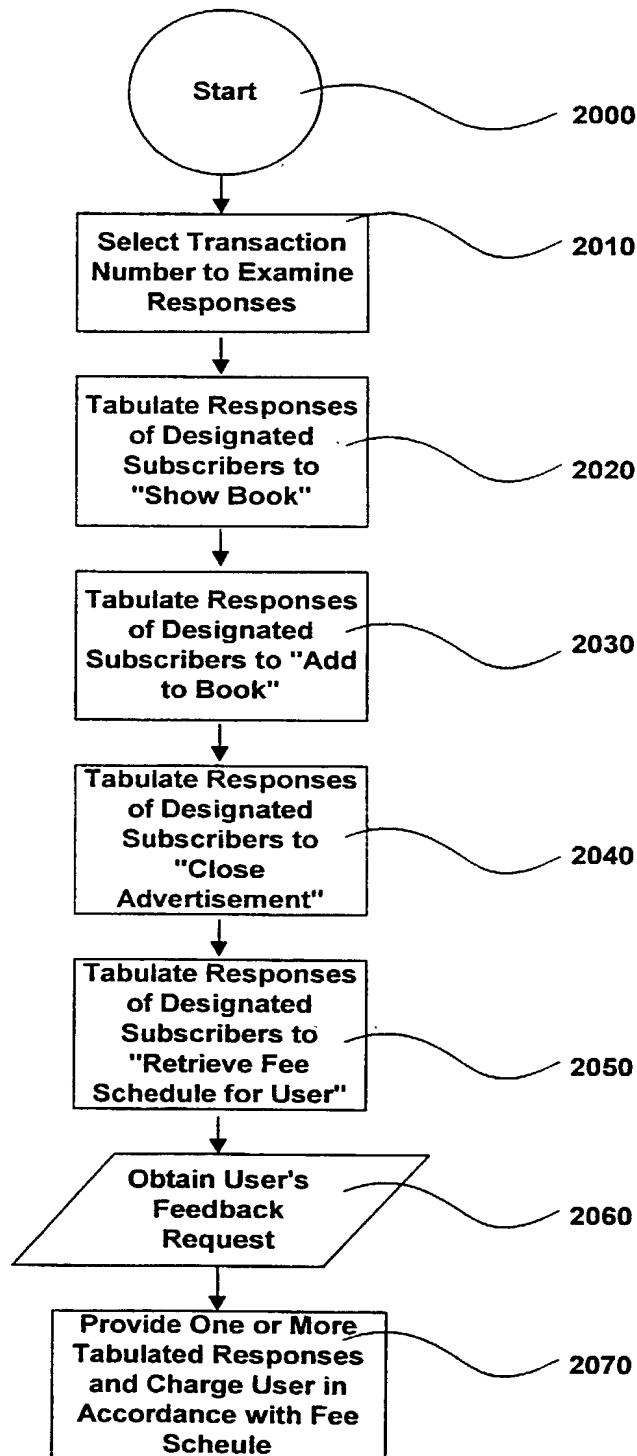


Figure 20

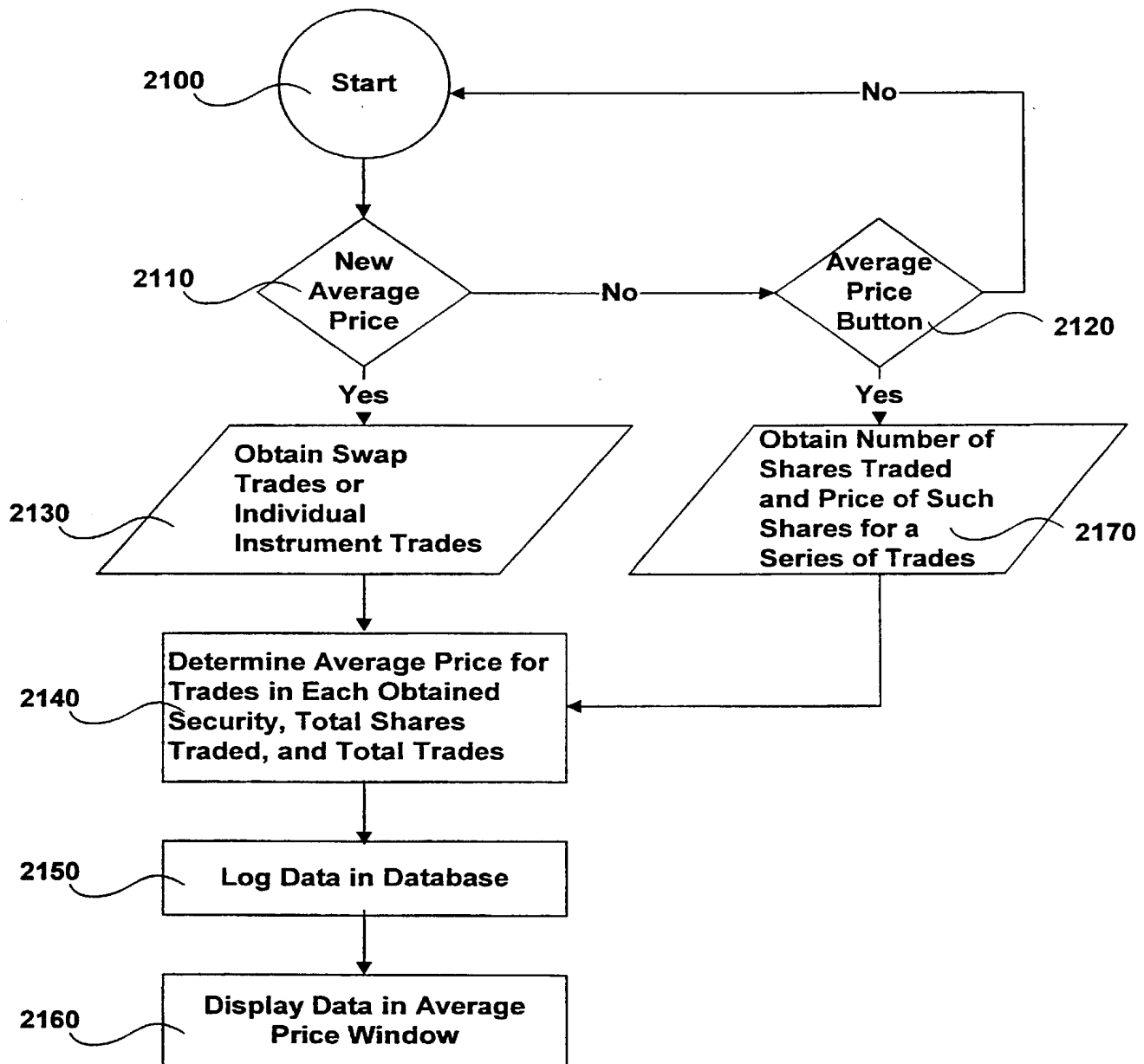


Figure 21

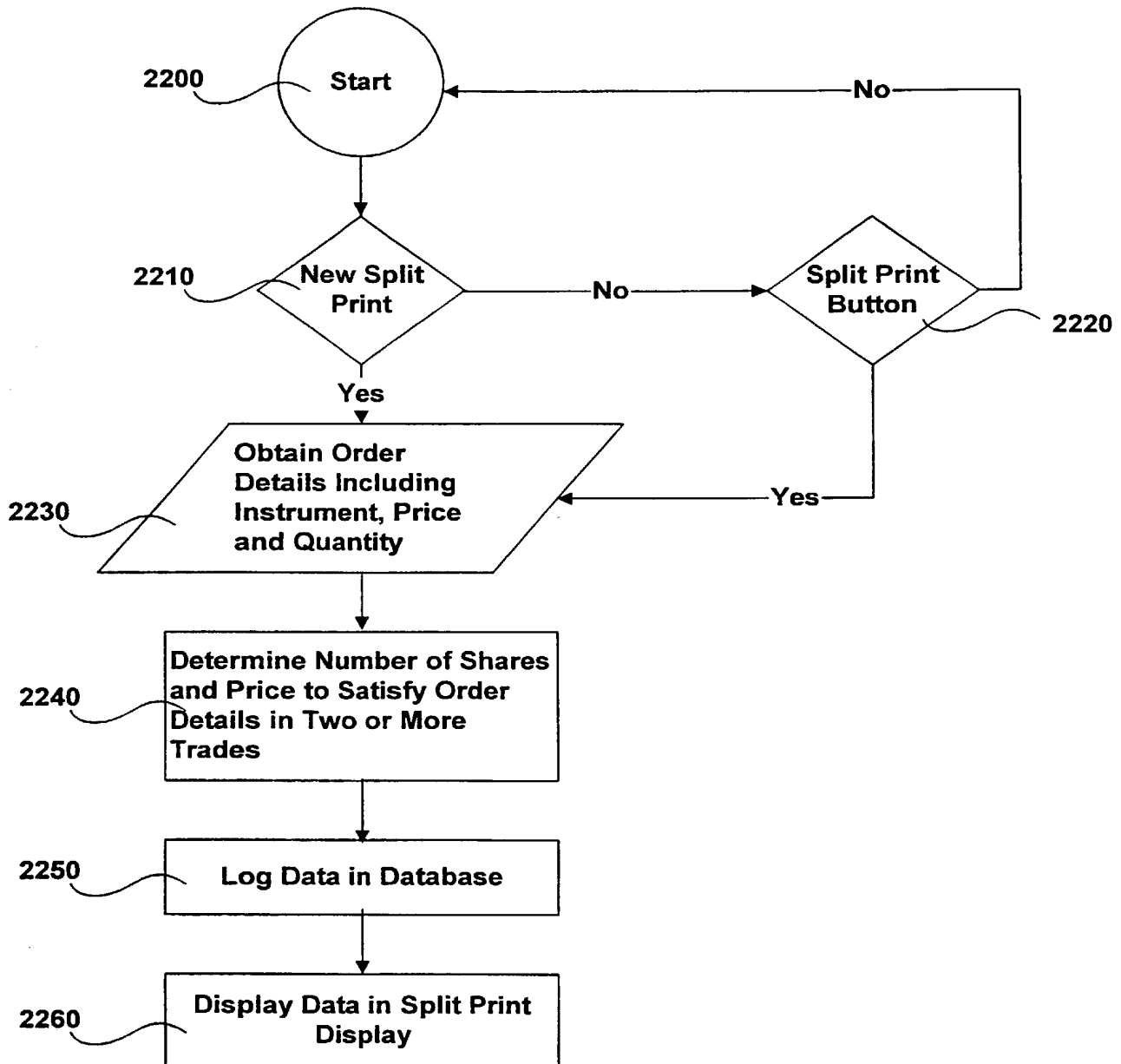


Figure 22

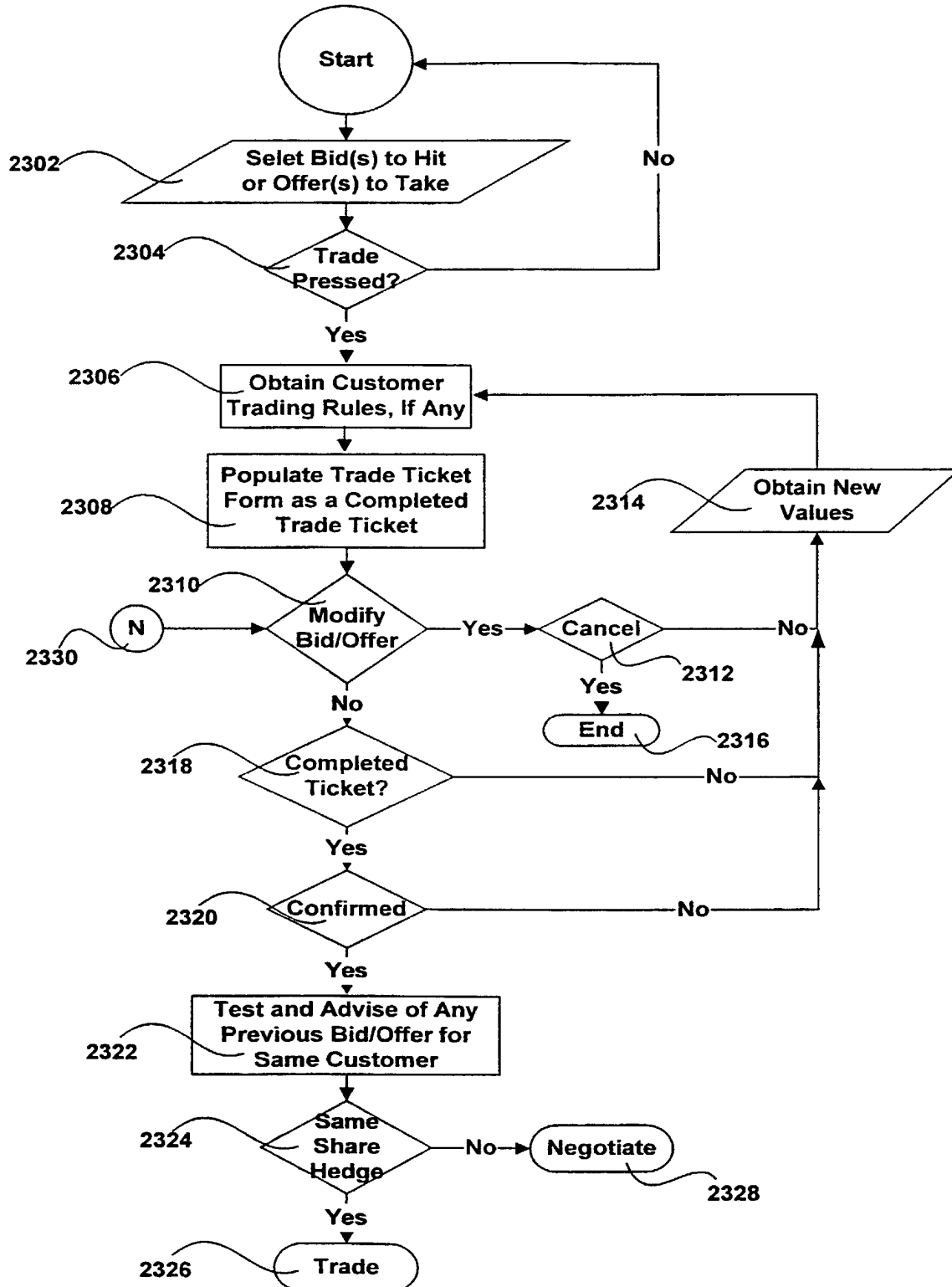


Figure 23

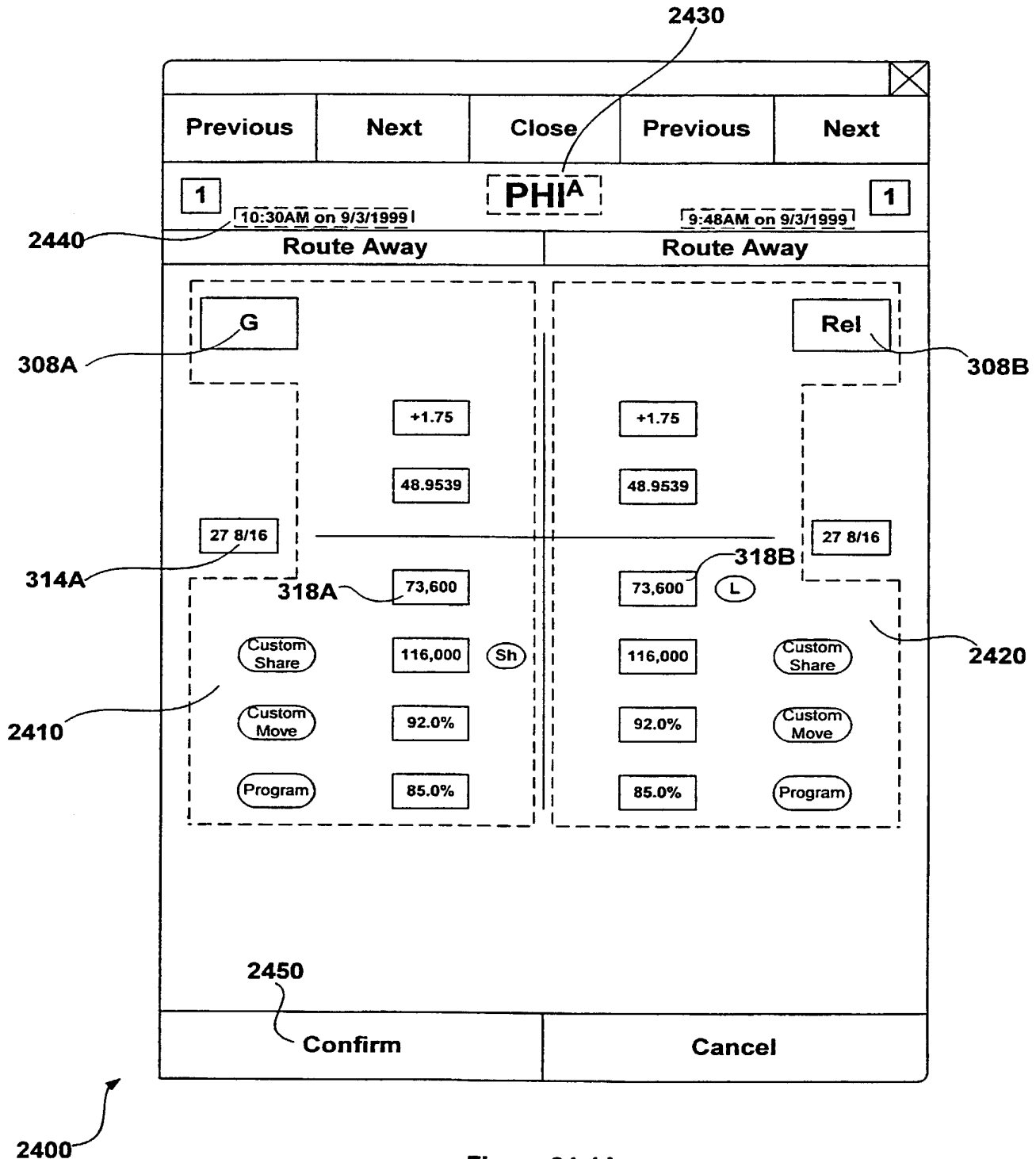


Figure 24-1A

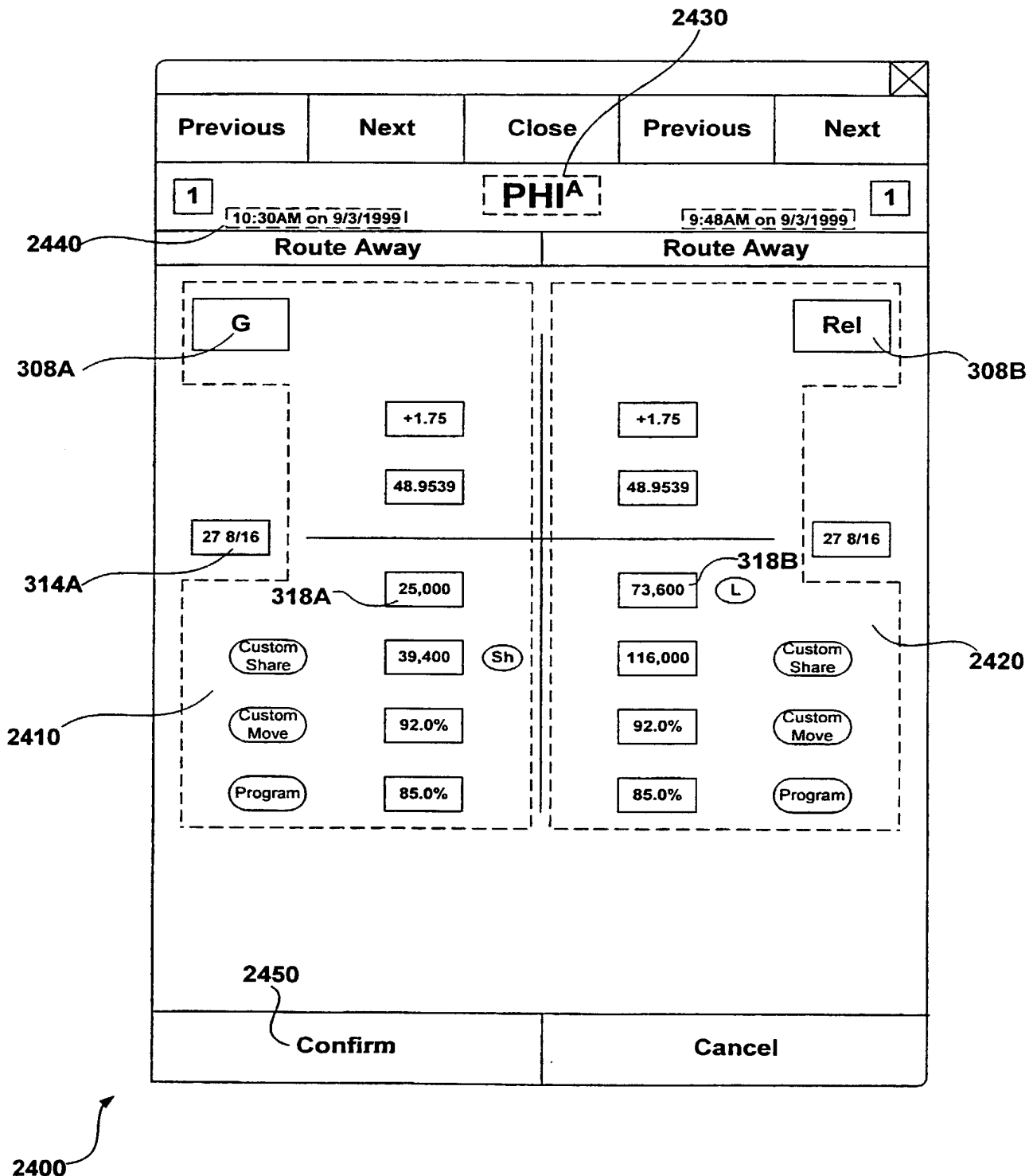


Figure 24-1B

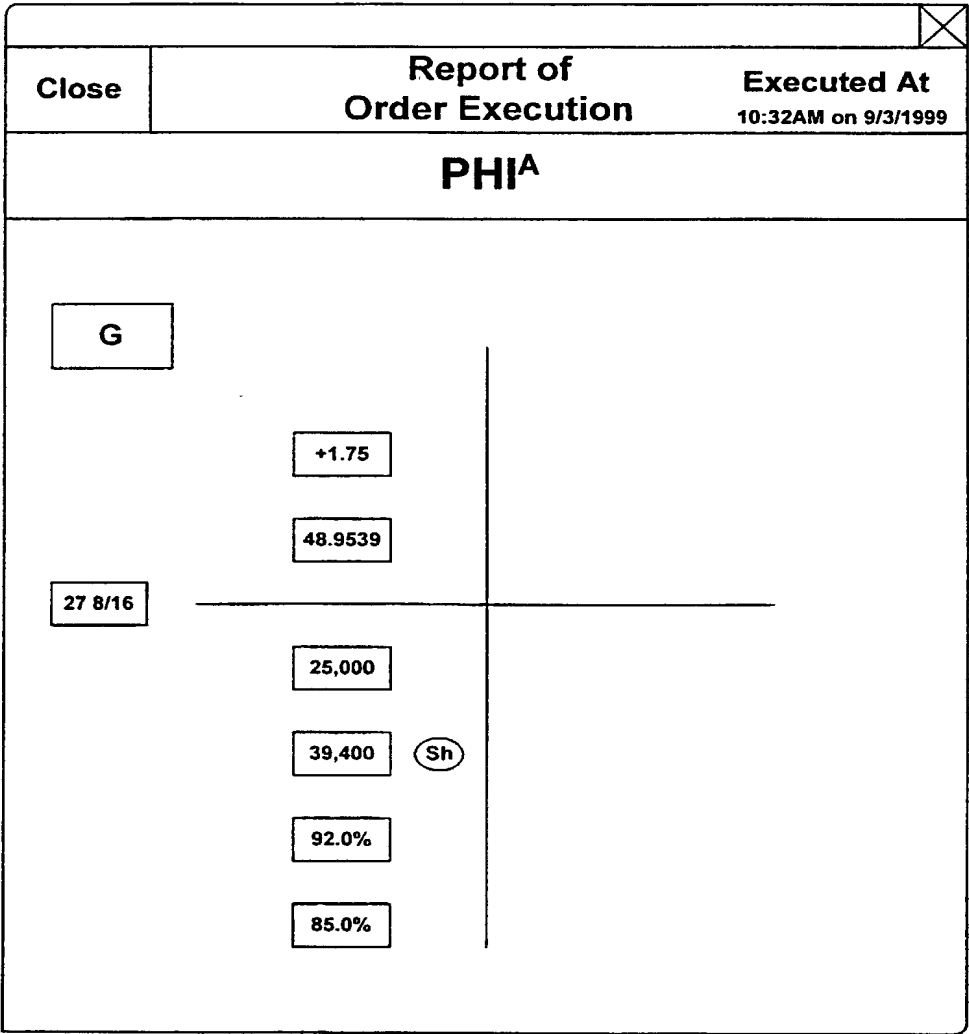


Figure 24-1C

Figure 24-1D

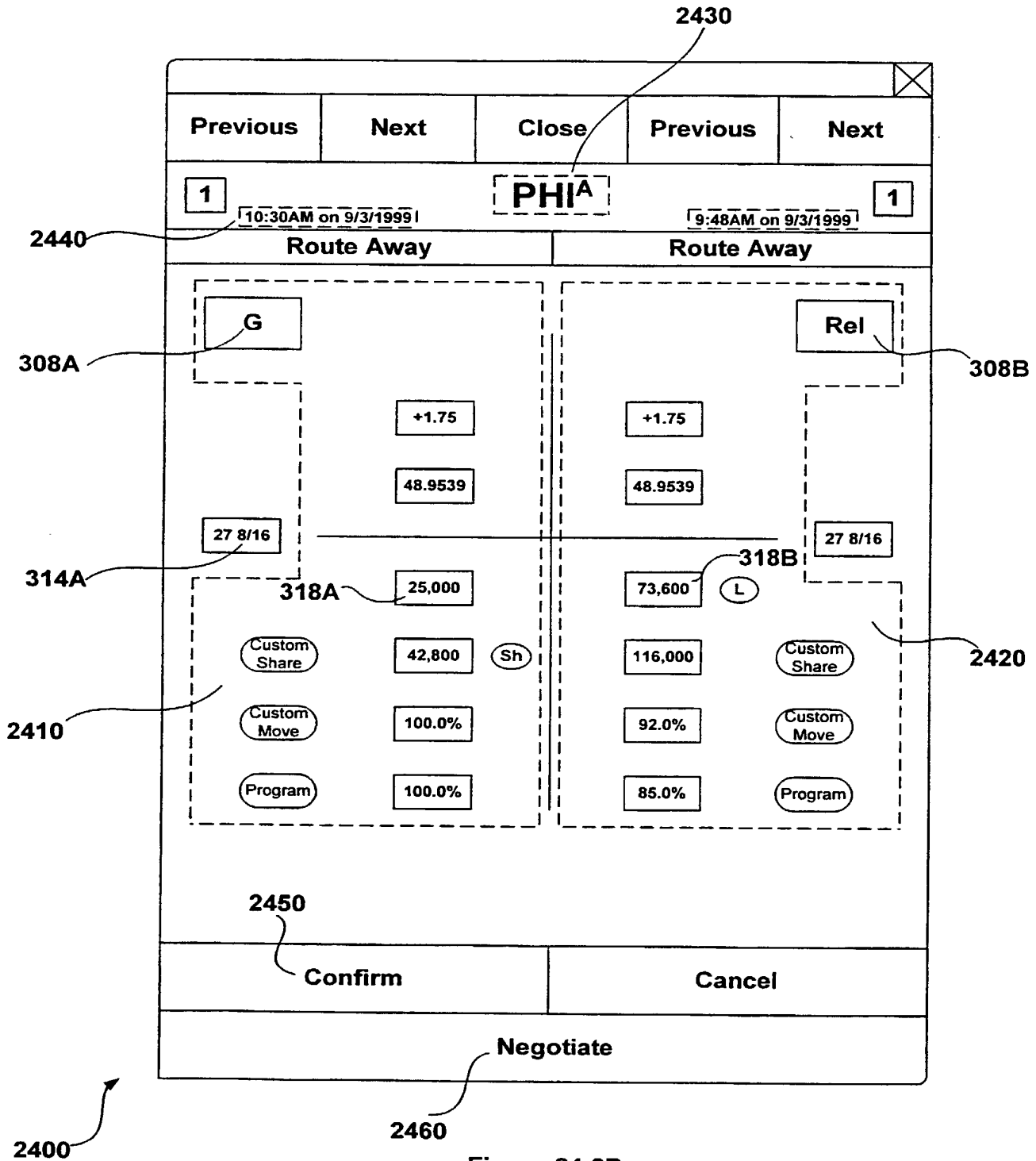


Figure 24-2B

Close		Report of Order Execution		Executed At 10:30AM on 9/3/1999	
PHIA					
<div> <div>G</div> <div> <div>+1.75</div> <div>48.9539</div> <div>27 8/16</div> <div>25,000</div> <div>42,800 (Sh)</div> <div>100.0%</div> <div>100.0%</div> </div> </div>					

Figure 24-2C

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<div> <div>Previous</div> <div>Next</div> <div>Close</div> <div>Previous</div> <div>Next</div> </div>				
<div> <div>PHIA</div> <div>9:48AM on 9/3/1999</div> <div>1</div> </div>				
Route Away		Route Away		
<div> <div>Rel</div> <div>+1.75</div> <div>48.9539</div> <div>48,600</div> <div>76,600</div> <div>92.0%</div> <div>85.0%</div> </div>		<div> <div>316BB</div> <div>324B</div> <div>318B</div> <div>27 8/16</div> <div>L</div> <div>Custom Share</div> <div>Custom Move</div> <div>Program</div> </div>		
<div> <div>Custom Share</div> <div>Custom Move</div> <div>Program</div> </div>		<div> <div>308B</div> <div>314B</div> </div>		
New Bid	Post Bid	New Offer	Post Offer	
Cancel Bid		Cancel Offer		

394B 398B 396B

Figure 24-2D

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Route Away		Route Away		
<div> <div>Rel</div> <div>+1.75</div> <div>48.9539</div> <div>48,600</div> <div>73,200</div> <div>87.93%</div> <div>85.0%</div> </div>		<div> <div>316BB</div> <div>324B</div> <div>318B</div> <div>27 8/16</div> <div>L</div> <div>Custom Share</div> <div>Custom Move</div> <div>Program</div> </div>		
<div> <div>Custom Share</div> <div>Custom Move</div> <div>Program</div> </div>		<div> <div>308B</div> <div>314B</div> </div>		
New Bid	Post Bid	New Offer	Post Offer	
Cancel Bid		Cancel Offer		

394B 398B 396B

Figure 24-2E

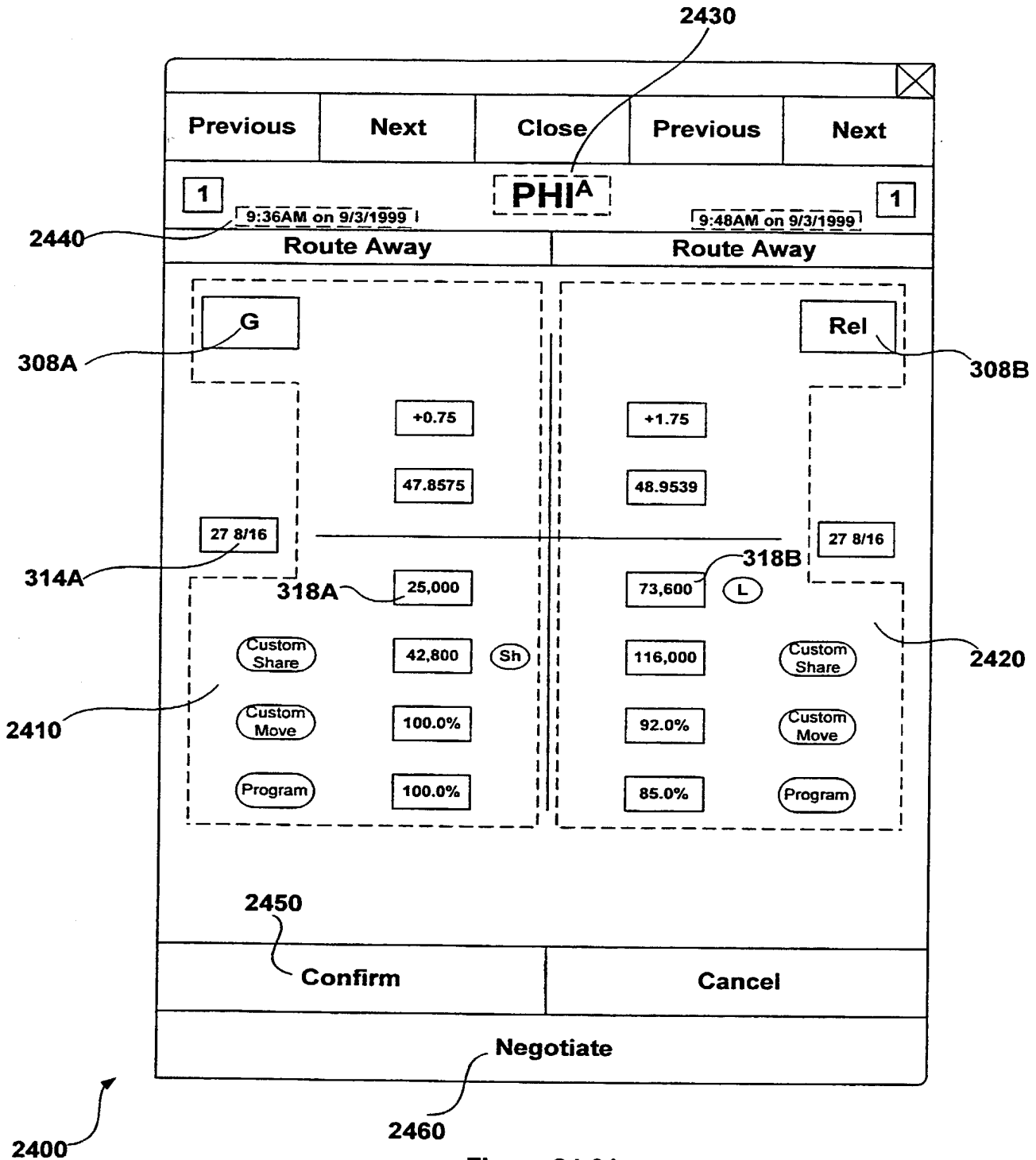


Figure 24-3A

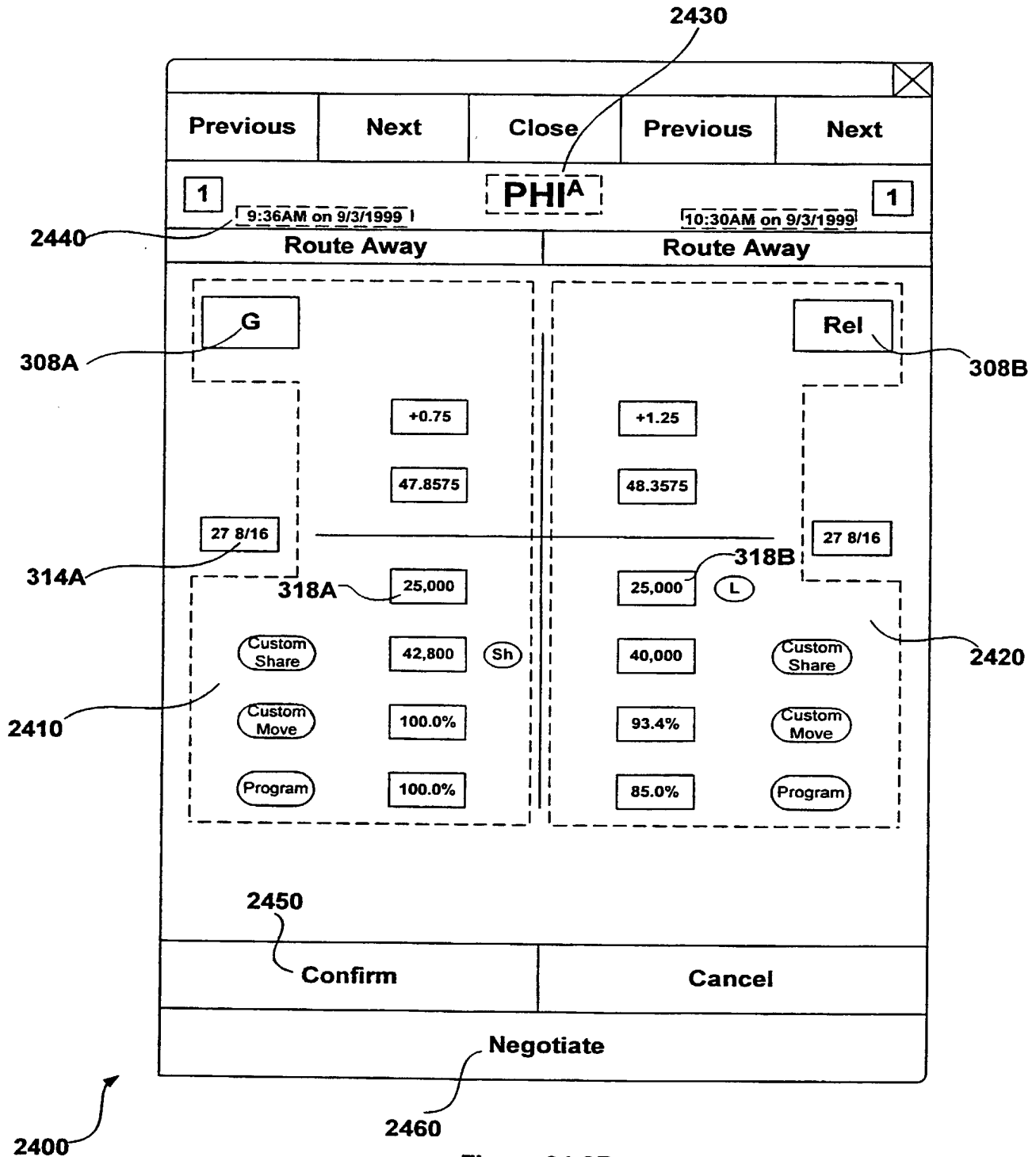


Figure 24-3B

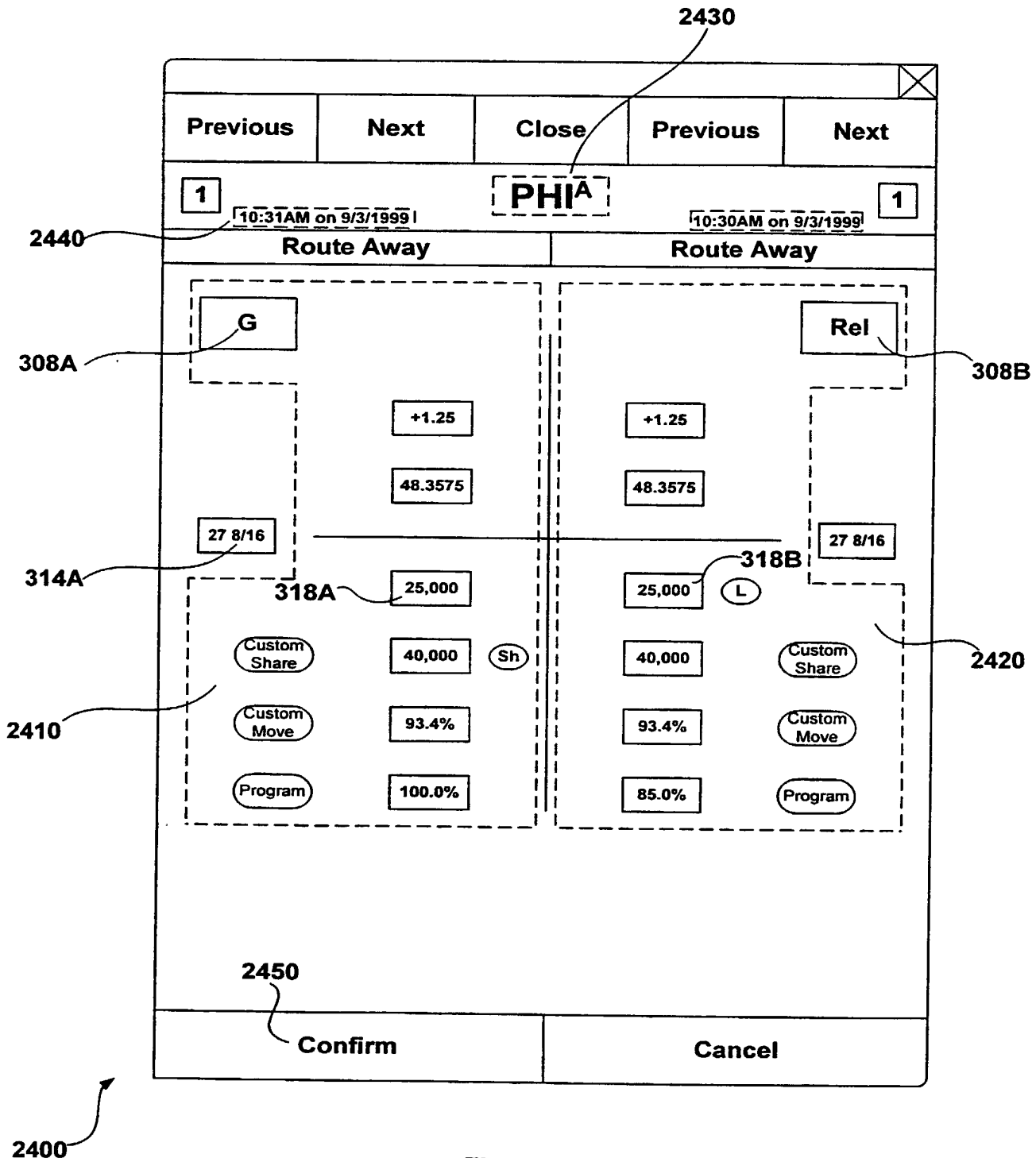


Figure 24-3C

10/03/1996

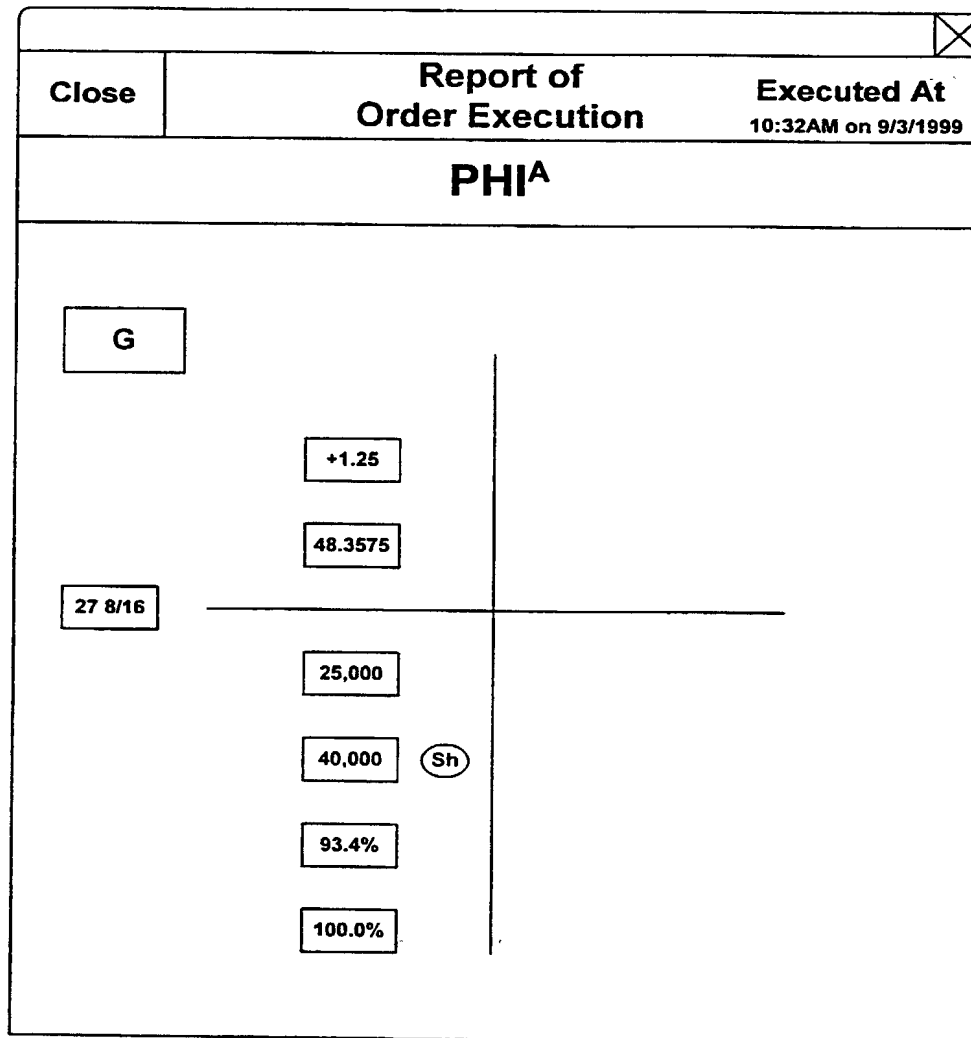


Figure 24-3D

10/031996

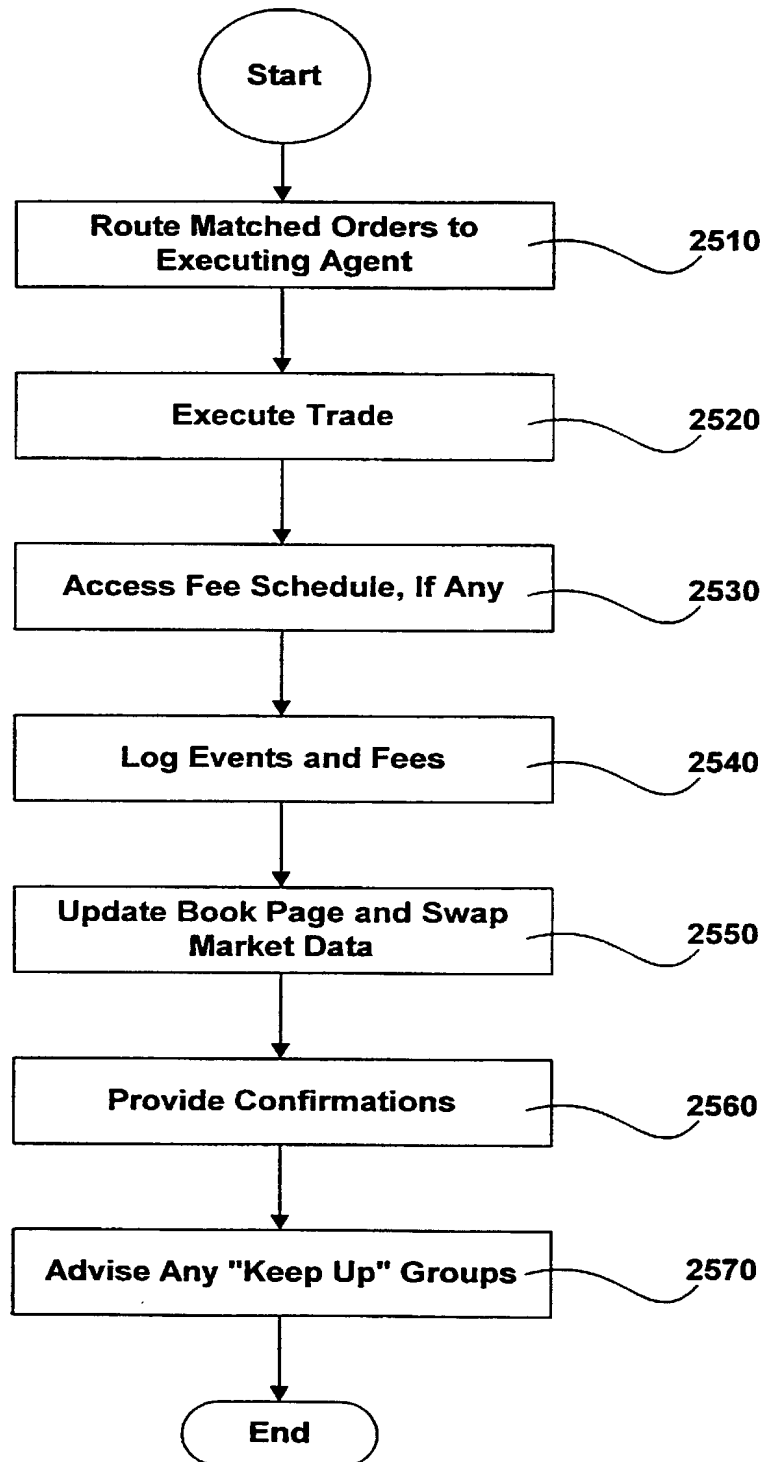


Figure 25
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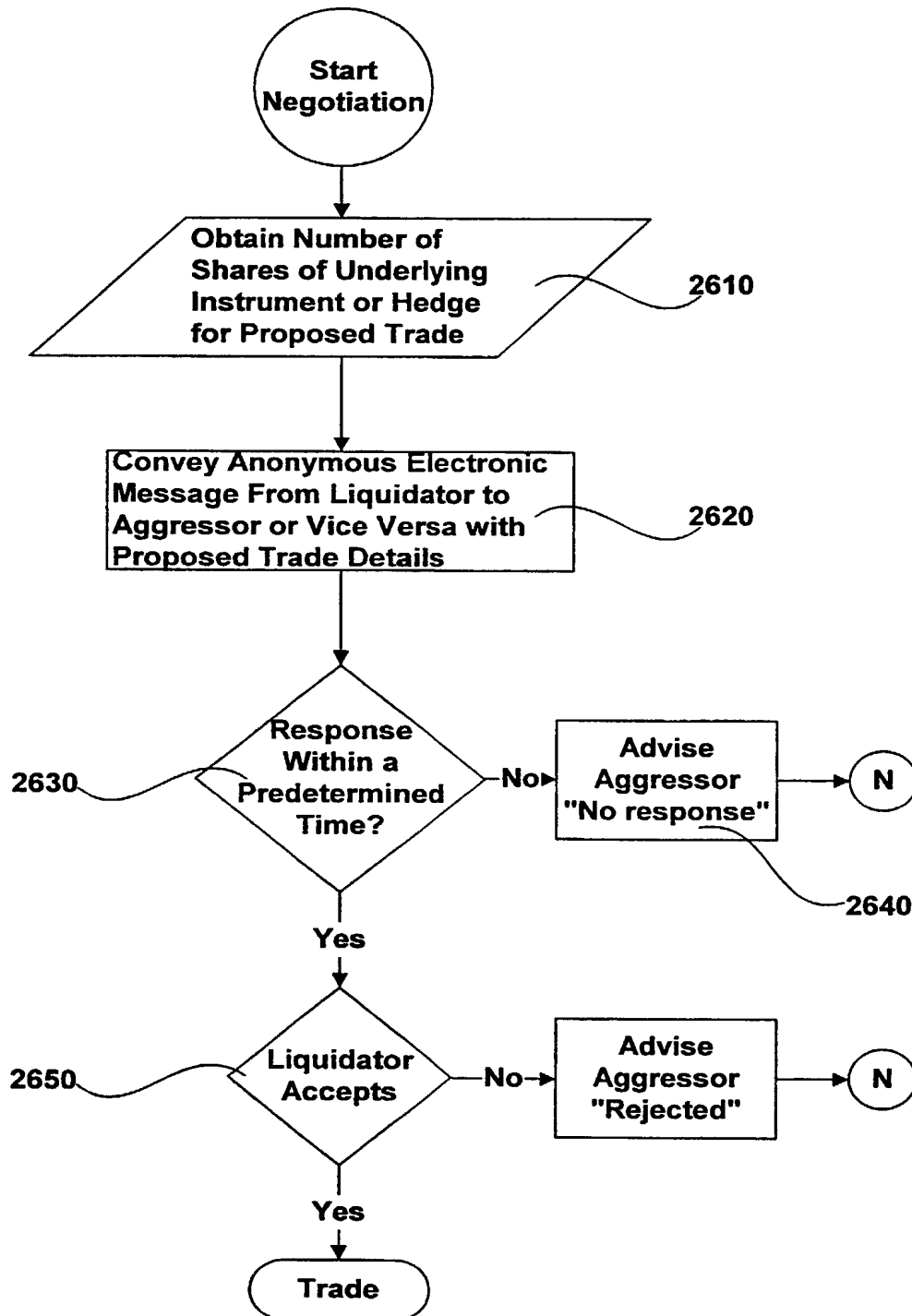


Figure 26

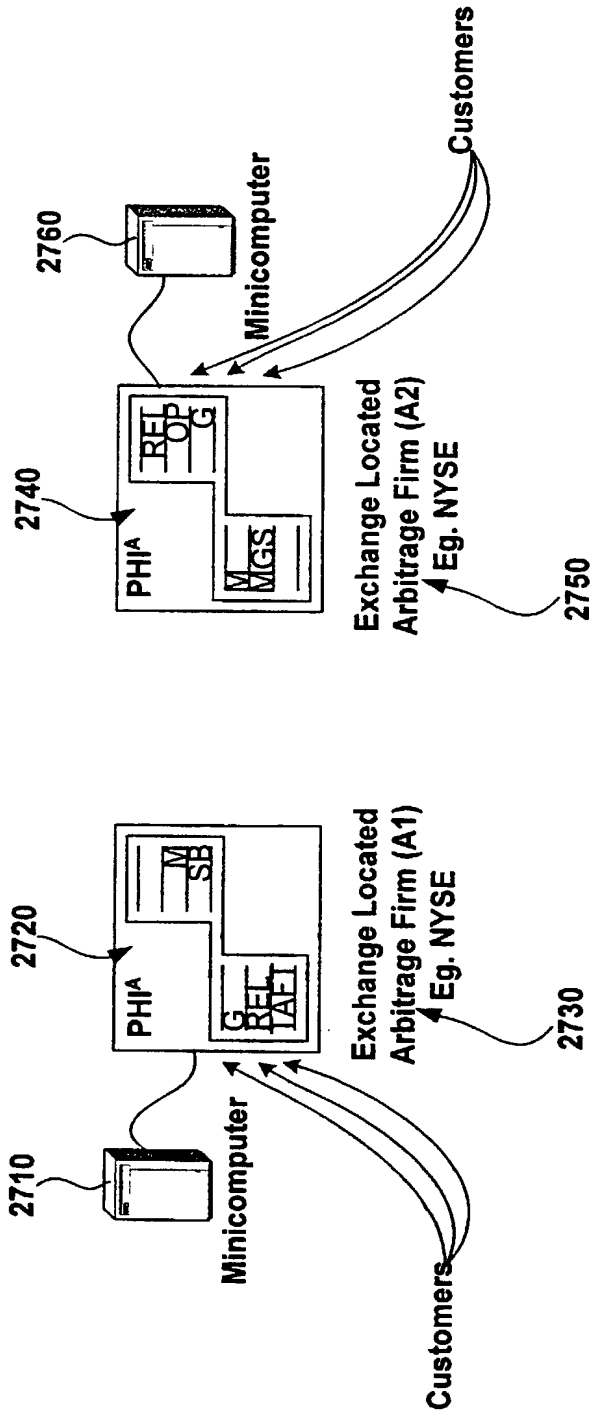


Figure 27

10/03/1996

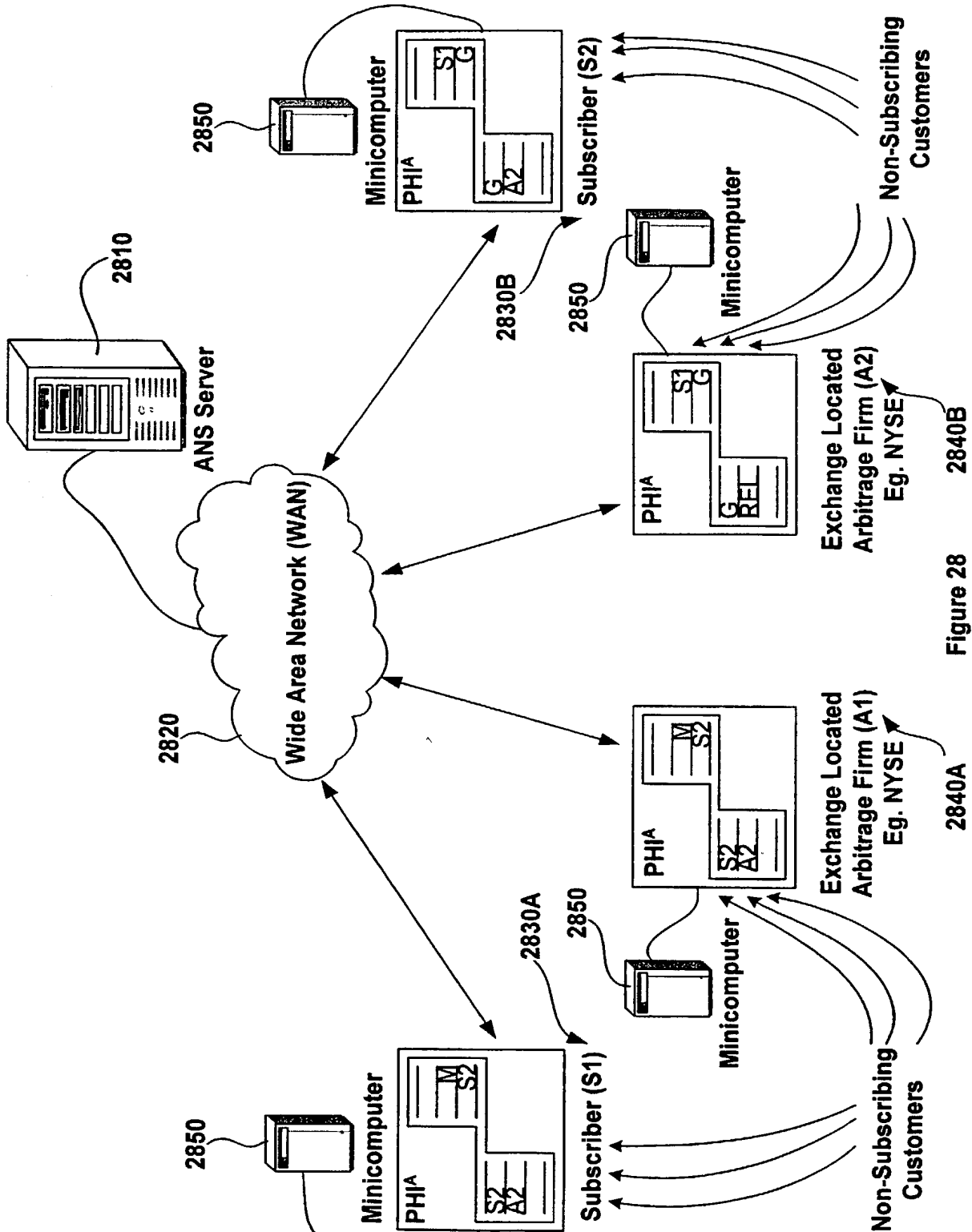


Figure 28

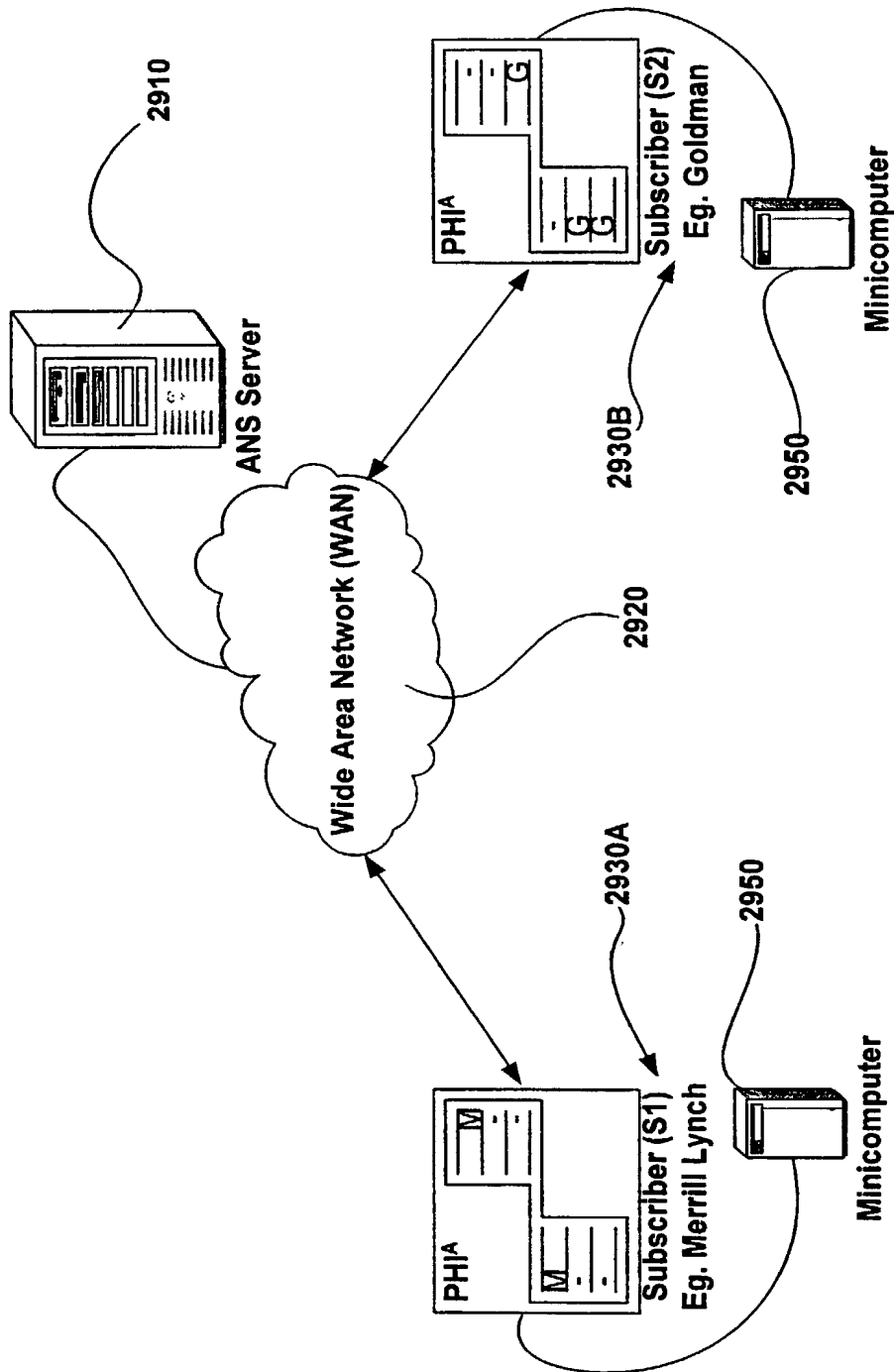


Figure 29

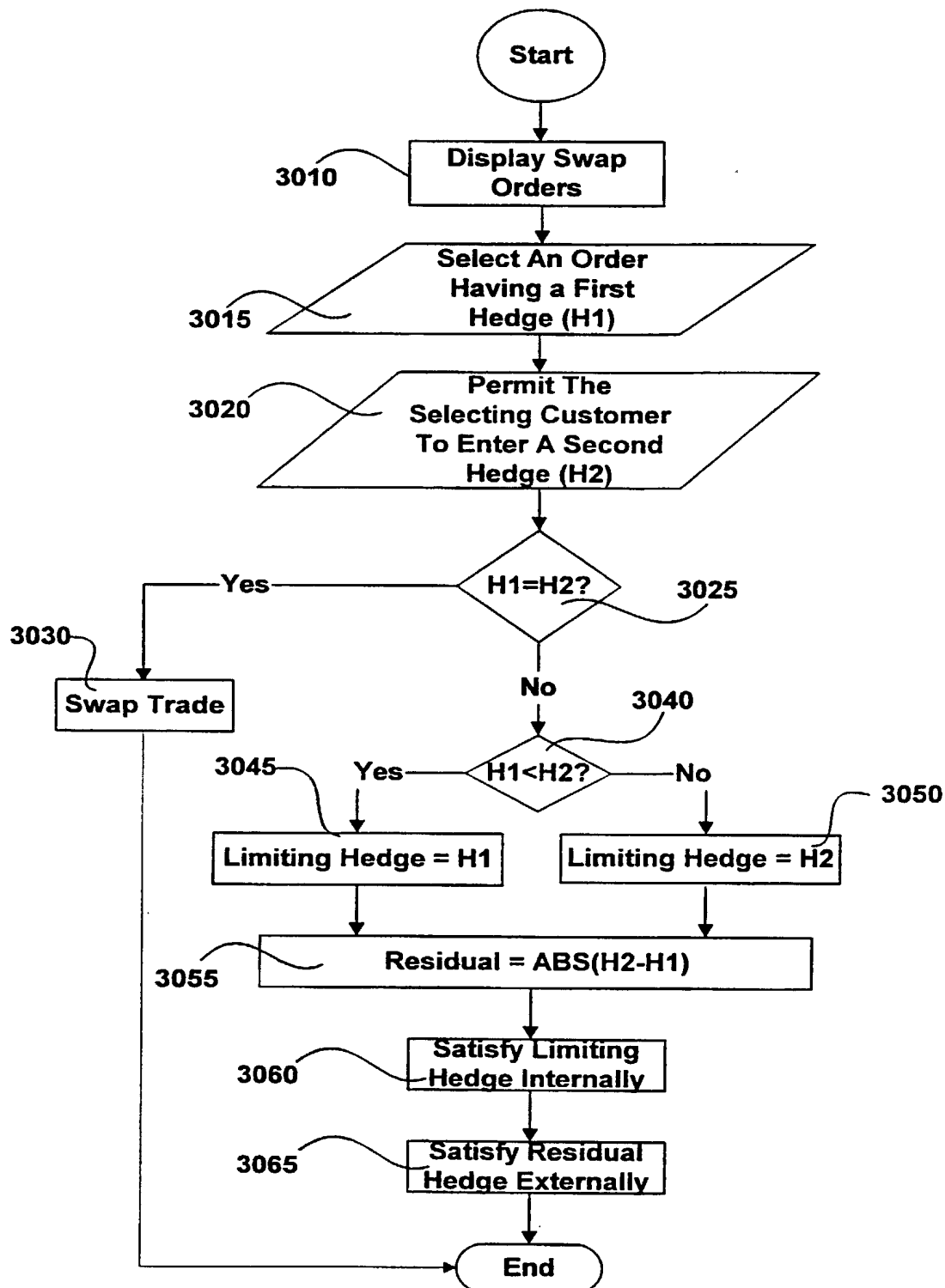


Figure 30

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER**2644/1F609-US4**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed for and which a patent is sought on the invention entitled:

SYSTEM AND METHOD FOR MANAGING SWAP ORDERS

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No. _____

on _____

and was amended

on _____ (if applicable).

☒ was filed as PCT international application

Number PCT/US00/20394

on July 24, 2000

and was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims as amended by any amendment referred to above

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1 56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT Indicate PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. 119
United States	60/145,473	23 July 1999	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
United States	60/162,168	28 October 1999	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

Combined Declaration for Patent Application and Power of Attorney (Continued) (Includes Reference to PCT International Applications)				ATTY'S DOCKET NUMBER 2644/1F609-US1	
I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:					
PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:					
U.S. APPLICATIONS			STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE		PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBER ASSIGNED (if any)			
POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. Morris Relson #15,108, Gordon D. Coplein #19,165, William F. Dudine, Jr. #20,569, Michael J. Sweedler #19,937, S. Peter Ludwig #25,351, Paul Fields #20,298, Joseph B. Lerch #26,936, Melvin C. Garner #26,272, Ethan Horwitz #27,646, Beverly B. Goodwin #28,417, Adda C. Gogoris #29,714, Martin E. Goldstein #20,869, Bert J. Lewen 19,407, Henry Sternberg #22,408, Peter C. Schechter #34,662, Robert Schaffer #31,494, Robert C. Sullivan, Jr. #30,499, Joseph R. Robinson #33,44, David Leason #36,195, and Paul F. Fehlner #35,135.					
Send Correspondence to: <div style="text-align: center;"> David Leason DARBY & DARBY P.C. <u>805 Third Avenue</u> New York, New York 10022-7513 </div>			Direct Telephone Calls to: (name and telephone number) <div style="text-align: center;"> (212) 527-7700 attorney name </div>		
2	FULL NAME OF INVENTOR	FAMILY NAME BORKOWSKI	FIRST GIVEN NAME Joseph	SECOND GIVEN NAME	
0	RESIDENCE & CITIZENSHIP	CITY Brooklyn	STATE OR FOREIGN COUNTRY New York	COUNTRY OF CITIZENSHIP U.S.	
1	POST OFFICE ADDRESS	POST OFFICE ADDRESS 9 South Oxford Street, Apt. 3	CITY Brooklyn	STATE & ZIP CODE/COUNTRY U.S.	
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME	
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
2	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME	
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
3	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.					
SIGNATURE OF INVENTOR 201		SIGNATURE OF INVENTOR 202		SIGNATURE OF INVENTOR 203	
DATE 01/28/02		DATE		DATE	